

## INDEX

### A

- A6 record, 931
- AAAA records, 931
- AAL (ATM Adaptation layer), 1116
- Access control identifiers (ACI), 1075–1076
- Access Control Lists (ACLs), 960, 1370
  - HFS (High performance Files system), 400–409
- Account Support Engineer (ASE), 654
- acctcom command, 531
- ACEdirector (Alteon), 1173
- Active Directory Service (ADS), Windows 2000, 1069–1070, 1087
- ACTIVE state, 341
- Acutime 2000 Synchronization Kit, 978
- Additive inverse, 1464
- addlog option, vxassist command, 350
- addpeer command, 988
- Address offset, 382
- Address ranges, 567–568
- Address space, 449
  - layout, 568
- Address swizzling, 570
- addr-pool-last-address=, 831
- addr-pool-start-address=, 831
- admin event, 1395
- Administrative domain, 1035
- Adoptive node, 1182–1183
- ADVA Optical, 1147
- Advanced peripherals configuration, 185–233
  - Fibre Channel SAN, 200–208
  - IO tree, reorganizing, 186–200
  - Online Addition and Replacement (OLA/R), 208–228
- Advocates, 4
- Age hand, 457
- Aged pages, 593
- AgentConfig.SD-CONFIG fileset, 701–703
- Aging a page, 457
- alert facility, syslogd, 485
- aliases.db file, 1006
- allow-bootp-clients=, 832
- allow-update policy, 957
- Alternate boot path (ALT), 75, 77, 86, 115, 170
- Alternate PV Links, 286–291, 370
  - defined, 286
- AND operator, truth table for, 238–239
- Annualized Failure Rate (AFR), 1170
- Anycast addressing, 855
- APA, *See* Automatic Port Aggregation (APA)
- Apache web server, 1095, 1102–1107
  - default web page, 1106
- Application monitoring script, 1230
- Application package IP address, 1182–1183
- Application package monitoring, 1232
- Application records, Process Resource Manager (PRM), 608–614
- Applied patches, 666
- Arbitrated Loop (FC-AL) topology, 1127
  - distance limitations, 1127
  - expansion limitations, 1127
  - Loop Initialization Protocol (LIP), 1128–1129
  - shared transport limitations, 1127–1128
- Arbitrated Loop Physical Address (AL\_PA), 1127
- Arbitrator nodes, 1321
- Architectural concepts, 10
- ARP (Address Resolution Protocol), 797, 803
- ARP Cache, 878
- ARP hack, 825–826
- Array Interface, 202
- ASU/9000 (Advanced Server for UNIX), 1034
- Asymmetric key, 1435–1436
- Asynchronous data replication, 1331
- Asynchronous Transfer Mode (ATM), 1115–1120
  - ATM Forum, 1117
  - defined, 1115
  - HP ATM solutions, 1117
  - serial link speeds, 1118–1119
  - service types, 1115–1116
    - Available Bit Rate (ABR), 1116
    - Constant Bit Rate (CBR), 1115
    - Unspecified Bit Rate (UBR), 1116
    - Variable Bit Rate (VBR), 1116
- ATM, *See* Asynchronous Transfer Mode (ATM)
- ATM Forum, 1117
- ATMARP Clients, 1118
- Attention light, 215–216
- Attributes, patches, 663–669
- audisp comman, 1397
- Audit log files, setting up, 1391–1399
- audswitch() system call, 1395
- audwrite() system call, 1395
- auth facility, syslogd, 485
- Authentication, 1437
- Authenticity, 1437
- AUTO file, 770, 773
- Auto FS, 381
- Autoconfiguration, IPv6, 854
- Automatic cluster reconfiguration, after node failure, 1176
- Automatic link failure and recovery, 859
- Automatic Port Aggregation (APA), 859–883
  - failover group:
    - using existing aggregates in, 878–883
  - high-availability network configuration, 870
  - Hot Standby configuration, 871–873
  - LAN Monitor Configuration, 873–878
  - hp\_apacnf:
    - manually configurung, 860–870
    - modifying, 871

## 1640 Index

- Auto-negotiation, 808–811
- AutoPath/XP, 291
- Available Bit Rate (ABR), 1116
- Available memory, 453
- B**
- B option, `parcreate` command, 96
- B\_Port, 1136
- backplane, 17
- Backup domain controllers (BDC), 1035
- Baltimore certificates, 1466, 1473
- Bandwidth, 1119
- Barriers, 1155
- Base cells, 88
- `base` option, `parcreate` command, 88
- Basic disk topology, 384
- Basic IP configuration, 797–887
  - Automatic Port Aggregation (APA), 859–883
  - basic network trace, performing, 839–843
  - data-link level testing, 799–803
  - dynamic IP allocation, 826–839
  - IP Address, 811–814
  - IP multiplexing, 851–853
  - IPv6, 853–859
  - link speed and auto-negotiation, 808–811
  - MAC address, changing, 803–808
  - network parameters, modifying with `ndd`, 843–851
  - networking kernel parameters, 798–799
  - static routes, 816–818
    - Proxy ARP, 825–826
    - subnetting, 814–816
- Bastian host, 1495
- Bathtub failure distribution, 1169
- BB\_Credits, 1144–1145
- BCH, 57–58
- BCH search command, 58
- BDRA, 784
- BEA, 1166
- BECN (Backward Explicit Congestion Notification), 1115
- Berkeley filesystem, 383
- Berkeley Internet Name Daemon (BIND), 912, 920, 923
- BIB, 80–82
- BIB (Boot-Is-Blocked), 80–82
- BIND v9.2.0, 912, 920, 923
- BIND v9.1.3, 853
- Blocking semaphores, 563
- BO command, 67–68, 78, 99, 110, 123
- Boot Authenticator for Standard Mode HP-UX, 1402
- Boot Console Handler (BCH), 57–58
- Boot Data Reserved Area (BDRA), 784
- Boot Inhibit Bit (BIB), 80–82
- Boot paths, 75, 77, 86, 94, 115, 169–170
- Boot string, 169–170
- Boot-Is-Blocked (BIB) state, 67
- `bootpd`, 830–831, 837
- `bootptab`, 830
- Boot-related attributes, changing, 169–171
- Bottlenecks, 529, 586–601
  - defined, 586
  - reasons for, 586
  - resolving, 587
- Bound CPUs, 130–131, 149
- Bound thread, 534
- Boundary concept, Single System Image (SSI), 1174
- Bridge port, 1136
- Broadcast address, 815–816
- Broadcast client, 995–996
- Browse Master, 1034
- Bucket-brigade attack, 1465
- Buffer credits, 1144
- Bureau International des Poids et Mesures (International Bureau of Weights and Measures) (BIPM), 977
- Business Copy XP, 1151
- C**
- Cabinet Level Utilities, 29
- Cabinet power monitors, 29
- Cache FS, 381
- Caching only slave, setting up, 943
- Caching-only server, 915
- Caesar cipher, 1434
- Calendar Server, 1229
- Call setup state, switched virtual circuits (SVCs), 1114
- Call termination state, switched virtual circuits (SVCs), 1114
- Campus Cluster solution, 1320
- CAP option, 618
- Capping, 605–606
- `cb` command, 501
- CBR, 1115
- CC command, 65, 67
- `ccmonpkg`, 1329–1330
- cc-NUMA, 10, 120
  - and multiprocessor environments, 554–556
- CDE, 459
- CDFS, 381
- `ce` command, 501
- cell board, 15, 17–18, 18, 23
- Cell Controller chip, 18, 21
- Cell delineation, 1116–1117
- Cell Local Memory (CLM), 24–25, 89
- Cell rate decoupling, 1117
- Cells, 17
  - behavior during initial boot of a partition, 80–83
- CERIAS (Center for Education and Research in Information Assurance and Security) project, 1420
- Certificate Revocation List (CRL), 1474
- Certification Authority (CA), 1437
- Certified System Engineers, 4
- `chacl` command, 400
- `chatr` command, 570, 576
  - POPS using, 582–585
- `chatr -M` command, 573
- Checksum, 1437
- CHIP ports, 1151
- `chroot` command, 785, 787
- Chunks of memory, 383, 451
- CIFS client configuration, 1041–1047
  - adding the CIFS filesystems to the `/etc/fstab` file, 1043
  - CIFS client start script, running, 1042
  - CIFS filesystems, mounting, 1043–1044
  - CIFS/9000 Client product, installing, 1041–1042

- cifslogin, 1044–1047
- cifslogout, 1045–1046
- cifsmount, 1046–1047
- creating a mount point directory, 1042
  - /etc/opt/cifsclient/
    - cifsclient.cfg, configuring, 1042
  - executing the /opt/cifsclient/bin/cifslogin program, 1044
- CIFS client daemon, restarting to pick up changes in smb.conf, 1052–1053
- CIFS client of server, 1034–1035
- CIFS server configuration, 1035–1041
  - CIFS daemon, starting, 1039
  - CIFS server functionality, enabling in /etc/rc.config.d/samba, 1036
  - CIFS-server software, installing, 1036
    - /etc/opt/samba/smb.conf, configuring, 1037
  - local SMB/CIFS password file, using, 1036
  - SMB password file, creating, 1039
  - verify the configuration with the smbclient utility, 1040–1041
  - verifying your smb.conf configuration with the testparm utility, 1038
  - Windows NT LanManager authentication, 1035–1036
- cifsclient command, 1042
- Circuit switching, 1112
- CISCO Systems, 1147, 1166
- Classes, IP addresses, 812–814
- Classical IP (CIP) address, 1118
- class-id, 835
- CLEAN state, 341
- cleanup command, 689–690
- Client Host Interface Port (CHIP), 1151
- Client mode, Router Discovery Protocol (RDP), 894–897
- Client profiles, deciding where to store, 1075
- clifsclient command, 1053
- CLM, 24–25, 89
- :clm option, parcreate command, 88–89
- clock.cuhk.edu.hk, 988
- clockwatch application, 1232–1234, 1272–1273
- close event, 1395
- Closed mutex, 533
- Cluster:
  - Active/Active, 1183
  - Active/Standby, 1183
  - basics of, 1183–1186
  - cluster coordinator, 1184
  - cluster monitoring, 1183
  - defined, 1183
  - Rolling Standby, 1183
  - setting up:
    - data center, 1188
    - disk drives, 1187
    - hardware and software considerations, 1187–1189
    - networks, 1187
    - performance, 1188
    - power supplies, 1187–1188
    - security, 1188–1189
    - SPU failure, 1187
    - user access, 1188
    - testing critical hardware, 1189–1193
      - disk drives, 1189–1192
      - LAN cards, 1192–1193
- Cluster lock functionality, 1323
- Cluster Management Daemon, 1177
- Cluster Object Manager software, 1310, 1312, 1378
- Cluster quorum, 1321
- Cluster-wide security policies, 1177
- CM command, 51, 68, 89
- cmapplyconf, 1273
- cmcheckconf, 1273
- cmclld, 1183–1184, 1212
- cmclnodelist file, 1310–1311
- cmgetconf, 1273
- cmquerycl, 1270, 1273
- cmrecovercl command, 1330
- cmviewcl, 1273
- CNAME (alias) names, making for all delegated hostnames, 948–951
- CNT, 1147
- Cocks, Clifford, 1439
- Code Book, The (Singh), 1435
- Collabra Server, 1229
- Colon hexadecimal notation, 854
- Committed Burst Size (CBS), 1115
- Committed Information Rate (CIR), 1115
- Committed patches, 666
- Common bottlenecks, 586–601
  - CPU bottlenecks, 587–592
  - disk bottlenecks, 596–600
  - memory bottlenecks, 593–596
- Common Internet Filesystem (CIFS/9000), 381, 1033–1064
  - CIFS client configuration, 1041–1047
    - adding the CIFS filesystems to the /etc/fstab file, 1043
  - cifslogin, 1044–1047
  - cifslogout, 1045–1046
  - cifsmount, 1046–1047
  - creating a mount point directory, 1042
    - /etc/opt/cifsclient/
      - cifsclient.cfg, configuring, 1042
    - executing the /opt/cifsclient/bin/cifslogin program, 1044
  - installing the CIFS/9000 Client product, 1041–1042
  - mounting the CIFS filesystems, 1043–1044
  - running the CIFS client start script, 1042
- CIFS client daemon:
  - restarting to pick up changes in smb.conf, 1052–1053
- CIFS client of server, 1034–1035
- CIFS server configuration, 1035–1041
  - CIFS daemon, starting, 1039
  - CIFS server functionality, enabling in /etc/rc.config.d/samba, 1036
  - CIFS-server software, installing, 1036
    - /etc/opt/samba/smb.conf, configuring, 1037

## 1642 Index

- local SMB/CIFS password file, using, 1036
  - SMB password file, creating, 1039
  - verify the configuration with the smbclient utility, 1040–1041
  - verifying your smb.conf configuration with the testparm utility, 1038
  - Windows NT LanManager authentication, 1035–1036
- defined, 1034
- Complete Plex, 313
- Complex Profile, 18
  - considerations when creating, 24–25
  - current, investigating, 35–36
  - Dynamic Complex Configuration Data (DCCD), 34
  - and GSP (Guardian Service Processor), 33–35
  - incoherent, 82
  - Partition Configuration Data (PCD), 34
  - Stable Complex Configuration Data (SCCD), 33, 100–101
  - and timestamp information, 35
- Computer Emergency Response Team (CERT), 1419
- Computer Operation, Audit, Security, and Technology (COAST) project, 1420
- Concurrency, in multiprocessor environments, 562–563
- conf.cacheonly file, 943
- Confidentiality, 1437
- Configuration:
  - defined, 1143
- Configuration attributes:
  - partitions:
    - changing, 167–169
- conf.sec file, 934–935
- conf.sec.save file, 934–936
- Consistency, 1150
- Constant Bit Rate (CBR), 1115
- Context switches, 540–541
  - defined, 539–540
  - reasons for, 540
- Continentalclusters, 1152, 1310, 1329–1360
  - configuration:
    - validating/testing, 1348–1359
  - configuration file:
    - editing/applying, 1342–1347
  - data replication:
    - configuring, 1333–1334
  - defined, 1329–1330
  - logical replication, 1331
  - monitor package:
    - editing/applying, 1339–1342
    - starting, 1347–1348
  - physical replication, 1331
  - primary cluster:
    - configuring, 1334–1336
  - primary packages:
    - ensuring normal operation of, 1347
  - recovery cluster:
    - configuring, 1336–1339
  - security files:
    - preparing, 1339
  - setting up, 1331–1332
  - software, installing, 1332–1333
  - tasks, 1359–1360
- Continuation inode, 1375
- Continuous Access XP, 1329, 1331
- Continuous Access XP Extended, 1150–1151
- Continuous Access XP Synchronous, 1150
- Control flag, 1051
- Controlled access protection, 1380
- convert operation, 367
- Copper cabling, 1122–1123
- COPS (Computer Oracle and Password System), 1420
- Core Cell alternate, 94
- Core Cell capable, use of term, 39, 44, 66–67
- Core cells, 88, 94
- Core class switches, 1129–1130
- Core IO Card, 19, 20–21
- Core OS Install and Recovery, 759
- Core Switch PID Format., 203
- Corrupt boot header:
  - including a missing ISL:
    - recovering, 760–774
- corrupt state, 666
- Cost of downtime, 1164
- CP command, 36, 39
- CPID (Creator Process ID), 566–567
- cpio, 382, 1374–1375
- cpm.collect.sh, 646
- CPU bottlenecks, 587–592
  - CPU Run Queue, 587–588
    - size of, 587
  - and CPU utilization, 587–589
  - CPU-related metrics to monitor, 590
  - example of, 589
  - hardware solutions to, 591
  - metrics to consider, 587
  - Priority Queue, 587
  - resolving, 591–592
  - software solutions to, 591–592
- CPU Run Queue, 587–588
  - size of, 587
- CPU self tests, 80
- CPU utilization, 587–589
- Crashdump, storing to tape, 523
- Crashed HP-UX system:
  - recovering, 759–793
    - corrupt boot header, including a missing ISL, 760–774
    - from having no bootable kernel, 774–781
    - from a missing critical boot file, 781–789
- create event, 1394
- Create ISAKMP Preshared Key window, 1473
- Creating the Genesis Partition, 44
- crit facility, syslogd, 485
- Criteria Thresholds, events, 489–490
- Critical Resource Analysis, 8, 209, 213–215
- cron facility, syslogd, 485
- CrossBar interface, 21–22
- Cryptography, 1434–1437
- Currency, 1150
- Customer LAN, 33
- customer\_defined\_run\_cmds, 1231
- cxperf command, 531

Cylinder groups, 383  
Cyphertext, 1434

**D**

`d_boot_authenticate` capability, 1400  
daemon facility, `syslogd`, 485–486  
daisy-chain multiple IO cardcages, 18  
Dark fibre, 1146  
Data Change Object (DCO), 350  
Data circuit-terminating equipment (DCE), 1113  
Data migration, 1077  
Data rate, 1148  
Data replication, 1322  
Data terminal equipment (DTE), 1113  
Data transfer state:  
    permanent virtual circuits (PVCs), 1114  
    switched virtual circuits (SVCs), 1114  
Data-link connection identifier (DLCI), 1113  
Data-Link layer, 799  
Data-link level testing, 799–803  
DataProtector, 1120  
DB\_READER, 1227  
DB2, 1229, 1276  
`db.cache` file, 943  
`dbd`, 451  
`db.root` file, 925  
DCE (Distributed Computing Environment), 1496  
DCF77 transmissions, 978  
`ddns-address`, 956  
Deactivations, and memory bottlenecks, 593  
DEAD\_COUNT, 875  
`debug` facility, `syslogd`, 485  
Dedicated Heartbeat LAN, 1176  
Default gateway, 825–826  
Default route, 817  
Default VLAN ID, 1153  
`delay` (roundtrip time) column, 984  
Delegated clients, configuring to reference delegated name servers, 948  
Delegated master name server, setting up, 945–948  
Delegated name servers, referencing in the name server database file, 951–953  
Delegated slave server, setting up, 948  
Delegated subdomain, 912–913  
Delegation, defined, 944  
`delete` event, 1394  
Demand-paged virtual memory system, 448  
Dense Wave Division Multiplexing (DWDM), 1123–1124, 1146  
`departing` disk groups, 364–366  
`desfree`, 455–457, 593  
*Designing Disaster Tolerant High Availability Clusters*, 1324  
DETACHED volumes, 340  
Detection Templates, 1446–1447  
DETACHED/IOFAIL state, 342  
`devassign` file, 1387  
Device assignment database, 1387  
device drivers, 9  
Device group, 835–837  
Device Interface, 202  
Device status, 489  
`dgcfbackup` command, 333  
`dgcfrestore` command, 333–334  
DHCP server:  
    configuring DNS to accept automatic updates from, 955–963  
    DNS master server:  
        updating, 956–963  
    updating, 955–956  
`dhcp_pool_group`, 831  
DHCPDISCOVER request, 831  
`dhcptab`, 836  
`dhcptools` command, 833–835  
`dhcpttrace`, 836  
DHCPv6, 853  
DI command, 55  
Diagnostics directory, 649  
`.dict` files, 488–489  
Diffie, Whiffle, 1439  
Diffie-Hellman crypto-system:  
    basics of, 1463–1465  
    failing of, 1465–1466  
Diffie-Hellman crypto-system, 1439–1440  
`dig` command, 931  
Digital signatures, 1437–1438  
Director class switches, 1129–1130  
Directories, 1067  
Directory Access Protocol (DAP), 1067–1068  
Directory Server, 1229  
Directory Services administrator password, 1077  
Dirty region log (DRL), 313  
DISABLED/ACTIVE state, 342  
DISABLED/IOFAIL state, 342  
DISABLED/NODEVICE STATE, 342  
DISABLED/OFFLINE state, 342  
DISABLED/REMOVED state, 342  
DISABLED/STALE state, 342  
Discretionary security protection, 1380  
DISENABLED volumes, 337–339, 337–340  
Disk bottlenecks, 596–600  
    and disk queue length, 596–597  
    hardware solutions to, 598–599  
    metrics, 596–598  
    and processes blocked on disk IO, IO, buffer cache, inode, 596–597  
    resolving, 598–600  
    software solutions to, 599–600  
Disk drives, testing, 1189–1192  
Disk group, 311  
Disk media, 311–312  
Disk media name, 316  
Disk striping, 246–253  
Disks/volumes:  
    Logical Volume Manager (LVM), 245–307  
    RAID levels, 236–238  
    Veritas Volume Manager (VxVM), 309–379  
`disp` (dispersion) column, 984  
Dispersion, 979–980  
Distinguished Name, 1069  
Distributed FS, 381  
Distributed lock manager (DLM), 1360  
Distributed Logical Volume, 248  
Distributed volume, 250

## 1644 Index

- DL command, 55
  - dlpi driver, 798
  - dmesg command, 517
  - dmp\_pathswitch\_blks\_shift kernel parameter, 373
  - DMZ, 1494–1495
  - DNS master server, updating, 956–963
  - dnsseckeygen, 925, 958
  - DocumentRoot directive, 1099
  - Domain name, 964
  - Domain Name System (DNS), 797, 911–973, 1067
    - additional backup slave and caching-only name servers:
      - configuring, 934–943
    - DNS forwarders:
      - delegating authority to, 944–955
    - DNS master server:
      - updating, 956–963
    - as glue of the Internet, 911
    - master name server:
      - configuring, 915–934
    - subdomain:
      - delegating authority to, 944–955
  - Domains, 912
    - user manager for, 1048
  - Don't Fragment* flag, 1482
  - Dotted octet notation, 812
  - DR command, 55
  - driftfile, 986
  - Dual-speed slots, 55–56
  - Dual-stack machines, 854
  - Dummy volumes, 253
  - dump, 382
  - Dump space, 447–472
  - DWDM, 1120–1121
  - Dynamic Complex Configuration Data (DCCD), 34
  - Dynamic DNS server (DDNS), 956
  - Dynamic DNS server updates, 963
  - Dynamic Host Configuration Protocol (DHCP), 828–839
    - booting a DHCP client, 837–839
    - defined, 828
    - device group, 835–837
    - individual node configuration, 830–831
    - pool group, 831–835
    - server configuration, 829–830
  - Dynamic IP allocation, 826–839
  - Dynamic Multipathing (DMP), 313, 370–373
  - Dynamic routing, 889–909
    - gated.conf configuration file, 891–892
    - network for, 890
    - Open Shortest Path First (OSPF), 900–906
    - Router Discovery Protocol (RDP), 892–897
      - client mode, 894–897
      - conclusions about, 897
      - server mode, 892–894
    - Routing Information Protocol (RIP), 897–900
      - conclusions about, 900
  - Dynamically Linked Kernel Modules (DLKM), 227
  - Dynamically Loadable Kernel Modules (DLKM), 474–478
  - Dynamically Tunable Kernel Parameters (DTKP), 478–480
- ## E
- E\_Port, 1135–1136, 1146
  - Easyspace, 916
  - Echelon, 25
  - Echelon/Rank, 25
  - Edge switches, 1129–1130, 1153
  - EFI, *See* Extensible Firmware Interface (EFI)
  - 800SUPPORT command, 762
  - 8-slot PCI cardcage, 18
  - EL command, 55
  - Ellis, James, 1439
  - elm, 1002
  - Elroy chip, 56
  - EMC Symmetrix SRDF, 1331–1332
  - emerg facility, syslogd, 485
  - EMPTY state, 341
  - EMS, *See* Event Monitoring System (EMS)
  - EMS dictionary, 488
  - EMS HA Monitors, 489–491, 1217–1218
  - EMS hardware monitors, 647, 649
  - EMS High Availability Monitors, 473
  - EMS Kernel Resource Monitor, 647, 649
  - Emulate LAN (ELAN) interfaces, 1118
  - Emulated private loop (EPL), 1129
  - ENABLED volumes, 337, 337–340
  - Encryption, 1155
  - Encryption key, 1434
  - Encryption algorithm, 1434
  - Enterprise Cluster Master Toolkit, 1229, 1230, 1276
  - Enterprise Server, 1229
  - Enterprise Server Pro, 1229
  - Entitlement-based SLOs, 626
  - Entity, 840
  - Entrust Security Certificates for Primary Authentication, 1466
  - Enumeration, 1087
  - EPIC (Explicitly Parallel Instruction Computing), 6
  - err facility, syslogd, 485
  - /etc/cmcluster/cmclconfig, 1177
  - /etc/default/security configuration file, 1369, 1402–1407
  - /etc/default/security configuration file, capabilities, 1402–1407
  - /etc/group, 1067
    - customizing, 1078
  - /etc/hosts file, 960
  - /etc/inittab, 190
  - /etc/ioconfig, 190
  - /etc/named.conf file, 926, 944, 956, 964, 966
    - setting up a forwarders entry in, 953–955
  - /etc/nsswitch.conf file, 960
  - /etc/ntp.conf, 980, 985, 989, 992
  - /etc/ntp.keys file, 992
  - /etc/opt/resmon/sbin/monconfig, 490
  - /etc/pam.conf file, 1049
    - configuring to utilize NTLM as an authentication protocol, 1049–1052
  - /etc/passwd file, 1035, 1039, 1067, 1374–1378
    - customizing, 1078
  - /etc/rndc.conf file, 936, 964
  - /etc/sbtabs, 784

- `/etc/services`, 1067
  - `/etc/services.window` configuration file, 578–579
  - Ethernet, 1113
  - Euclid's algorithm, 1464
  - EUI-64 identifier, 855
  - Evaluation levels, ITSEC, 1382
  - Event Monitoring System (EMS), 484, 488–494, 1183, 1227
  - Events:
    - Criteria Thresholds, 489–490
    - defined, 488
  - Excess Burst Size (EBS) Traffic Management parameters, 1115
  - EXEC\_MAGIC executable, 571–572, 574–575
  - EXPORT option, 619
  - Extend Serviceguard Cluster, 1152
  - Extended fabrics, 1120–1121
    - long distances, 1144–1145
    - switches, 1143–1144
  - Extended Long Wave GBICS, 1123
  - Extended Serviceguard cluster, 1319–1365
    - Continental clusters, 1329–1360
    - data replication in, 1322
    - Metrocluster, 1323–1329
    - networking in, 1322
    - Serviceguard extension for SAP, 1360–1361
    - Serviceguard Extensions for Oracle Real Application Clusters (RAC), 1360
    - three data centers:
      - design limitations, 1321
    - two data centers:
      - design limitations, 1320–1321
  - Extensible Firmware Interface (EFI), 58, 319
    - numbering convention, 61
  - Extent-based striped logical volume, 247–248
    - drawback of, 251–252
- F**
- F\_Port, 1135
  - Fabric, defined, 1129
  - Fabric Discovery, 80
  - Fabric Login (FLOGI), 1128, 1130–1131, 1135
  - Failed disk, recovering, 333–342
  - FAILING disk, 340, 335
  - Failover group, 859–860
  - FAILOVER\_GROUP, 875
  - Fair Share Scheduler, 601
  - Fast EtherChannel (FEC/PAGP) technology, 860
  - Fast Ethernet, 808–809
  - FastTrack Server, 1229
  - Fat pipe, 859, 867
  - Fault Tolerant systems, 1164–1165
  - FC-AL topology, 1127
    - distance limitations, 1127
    - expansion limitations, 1127
    - Loop Initialization Protocol (LIP), 1128–1129
    - shared transport limitations, 1127–1128
  - `fcmstutil` command, 1125, 1131, 1139, 1141
  - FDDI, 860, 870, 1117
  - FEC\_AUTO protocol, 862, 863, 867, 870–871, 874, 880
  - FECN (Forward Explicit Congestion Notification), 1115
  - Fibre Channel, 8, 9, 906, 1112, 1120–1122, 1175
    - copper cabling, 1122–1123
    - fibre-optic cable, 1122–1123
    - frame, 1144
    - physical medium, 1122
    - protocol layers, 1122
    - standards, 1122, 1129
    - topologies supported by, 1127
  - Fibre Channel SANs, 200–208, 1120, 1146
  - Fibre-optic cable, 1122–1123
    - multi-mode fibre, 1123
    - single-mode fibre, 1122–1123
  - File and directory permissions, 1370–1376
    - HFS Access Control Lists, 1375–1376
    - VXFS Access Control Lists, 1371–1375
  - Filesystems, 9, 10, 381–445, 409–414, 529
    - basic characteristics, 382–383
      - large files, 382
    - Berkeley filesystem, 383
    - HFS (High performance Files system), 382
      - Access Control Lists (ACLs), 400–409
      - internal structure, 383–388
      - tuning, 388–400
    - McKusick filesystem, 383
    - mount options to affect IO performance, 428–429
    - navigating:
      - via the VFS layer, 434–437
    - online JFS features, 409–414
      - controlling synchronous io (`convosync=`), 429–430
      - logging levels used by the intent log, 416–420
      - online de-fragmentation of, 414–416
      - upgrading an older VxFS filesystem, 409–414
    - structure of, 381
    - VxFS filesystem,:
      - tuning, 421–428
      - VxFS Snapshots, 431–434
  - `finger` command, 1087
  - Firewalls, 1155, 1495
  - First-level security concerns, 1369
  - `fl` command, 495
  - FL\_Port, 1135
  - flex-cable connectors, 21
  - Floating CPUs, 130
  - FLOGI, 1128, 1130–1131, 1135, 1138
  - FLPs (fast link pulses), 808–809
  - `fork()` system call, 537
  - `forwarders`, setting up, 953–955
  - Forwarding requests, 914
  - FQDN, *See* Fully Qualified Domain Name (FQDN)
  - `fr` command, 495
  - Fragmentation Needed* flag, 1482
  - Frame Relay packet-switched network (PSN), 1113
    - supported adapters, 1115
  - `fsck` command, 340, 381, 777, 789
  - `fsdb` command, 386–387
  - FSPF (Fibre Shortest Path First), 906, 1126, 1143
  - `ftp`, 784, 1423
  - `ftpd`, 785

## 1646 Index

Fully Qualified Domain Name (FQDN), 912, 915–916, 931  
 Fully qualified entries, 1069  
 Fundamental Tenet of Cryptography, 1439

### G

G\_Port, 1136  
 Gardner, Martin, 1435  
 gated routing daemon, 817–818, 824–825, 889–890  
 gated.conf configuration file, 891–892, 897  
 GBIC (Gigabit Interface Converter), 1123  
 General Release patch, 642  
 General/Special recalled patch, 643  
 General/Special Superseded patch, 643  
 Generic UNIX monitoring tools, 531  
 Genesis Partition, 15, 63–80  
     boot actions, 75–80  
     creating, 61–62, 65–80  
     ensuring cells are inactive, 63–65  
 getmemwindow command, 579  
 glance command, 143, 531, 535, 588  
     Processor Sets in, 561–562  
 Global addresses, 854  
 Global area, 459  
 Global Catalog server, 1087–1088  
 Global Environment directives, 1103  
 Global Virtual Address (GVA), 450  
 Global Wait States, 588–589  
 Glue records, 914  
 Gold Applications patch bundle, 647  
 Gold Base depot, 647  
 Golden Image, 698  
     creating, 727  
         using make\_sys\_image, 728–730  
     creating Ignite-UX configuration file  
         representing contents of, 730–735  
         Post-Configure script/Post-Load script,  
         734–735  
     defined, 727  
     setting up, 727–744  
     testing the configuration, 741–744  
 GOLDQPK111 depot, 648  
 gpgslim, 457, 593  
 gpm command, 531  
 GPS receiver, 978  
 Grande chip, 55  
 Greenwich Meridian, 977, 987  
 grep command, 1480–1481  
 Group membership service (GMS), 1360  
 groups command, 1087  
 GSP (Guardian Service Processor), 18, 20–21, 28, 30–55  
     administrator-level user, 31, 45  
     categories of user on, 45  
     Chassis/Console Log screen, 51, 53  
     Command Menu screen, 50  
     and Complex Profile, 33–35  
     Console screen, 51–53  
     Customer LAN, 33  
     GSP Command Menu, 36, 45  
     Local serial port, 33  
     operator-level user, 31, 45  
     Private LAN, 32–33

Remote serial port, 33  
 single partition user, 45  
 SO command, 45  
 switches, 34  
 Virtual Front Panels (VFP) screen, 51–52  
 Guardian Service Processor (GSP), *See* GSP (Guardian Service Processor)

### H

-H option, shutdown command, 63  
 HACMP (IBM), 1174  
 Halfdome Utility Communications (or Connector) Board (HUCB), 29–30  
 halt-for-reconfig, 62  
 Hard reset, 171  
 Hard zoning, 1137, 1140–1141  
 Hardware enablement patch bundle, 647  
 Hardware monitor, 489  
 Hardware Path, 58  
     components of, 59  
 Hardware status monitoring, 489  
 Hardware support call, 504, 509–510  
 Hashed Page Table (HTBL), 451  
 <HBA hardware path>, 203, 1133  
 HBA (host bus adapter), 1123–1124  
 HBPB0 (Halfdome BackPlane Board 0), 21  
 HE command, 44  
 Heap, 568  
 Heartbeat LAN, 1176  
 HEARTBEAT\_IP, 1184  
 Hellman, Martin, 1439  
 Hewlett-Packard, Precision Architecture (HP), 5–7  
 HFS Access Control Lists, 1375–1376  
 HFS (High performance Files system), 382  
     Access Control Lists (ACLs), 400–409  
     basic layout, 385  
     inode, 386  
     internal structure, 383–388  
     tuning, 388–400  
 HIDS, 459, *See* Host Intrusion Detection System (HIDS)  
 High Availability Alternative (HAA), 75–76, 86, 115  
 High Availability Clusters, 1171–1174  
     and Serviceguard, 1174–1178  
     synchronous/asynchronous data replication in,  
     1152  
 High Availability (HA), 1163–1180  
     Annualized Failure Rate (AFR), 1170  
     cluster, 1171  
     defined, 1164–1165  
     as a design principle, 1165–1166  
     five 9s, 1168–1170  
         Mean Time Between Failures (MTBF),  
         1169–1170  
     percentages, 1168  
     pillars of:  
         IT processes, 1167  
         support partnerships, 1167  
         technology infrastructure, 1166–1167  
     reasons for interest in, 1164–1165  
     statement defining, 1170  
 High Priority Machine Check (HPMC), 504–505  
     defined, 506

- High-priority sleepers, 549
  - High-speed cache, 7, 10
  - HMIOB (Halfdome Master IO Backplane), 20
  - hn, 832
  - Hop count, 899
  - Host address (host ID), 812
  - Host Bus Adapter (HBA), 1123–1124
  - Host Intrusion Detection System (HIDS), 1446–1463
    - conclusions about, 1463
    - defined, 1446
    - Detection Templates, 1446–1447
    - HIDS Agent software:
      - starting, 1454–1455
    - HIDS clients:
      - importing public keys on, 1452–1453
      - multi-homed, 1450–1452
      - response programs, creating, 1461–1463
      - selecting the hosts to be monitored, 1458–1459
    - HIDS server:
      - creating private/public keys on, 1448–1452
      - monitoring alerts on, 1460–1461
      - multi-homed, 1449–1450
    - installing HIDS on the HIDS server and all HIDS clients, 1448
  - Surveillance Group:
    - creating to contain relevant Detection templates, 1456–1458
  - Surveillance Schedule:
    - downloading/activating to relevant HIDS clients, 1459
    - surveillance survey, creating to reference the Surveillance Group, 1455
- Hostnames, 912
- hosts\_to\_named utility, 915, 918–921, 1011
- Hot Standby, 859
- Howes, T., 1067, 1067–1068
- HP AutoPath/VA, 291
- HP e-Commerce Traffic Director Server Appliance SA8220, 1173
- HP Hardware Customer Engineer, 784
- HP Instant Support Enterprise Edition, 647–648
- HP online Software Depot,
  - security\_patch\_check, 649–654
- HP Proliant PC, 32
- HP Systems Partitions Guide*, 15
- HP\_APA\_DEFAULT\_PORT\_MODE, 862
- HP\_APA\_GROUP\_CAPABILITY (FEC\_AUTO only) configuration setting, 862
- HP\_APA\_START\_LA\_PPA, 862
- hp\_apaconf file, 863
  - manually configuring, 860–870
- HP\_APAPORT\_CONFIG\_MODE, 862
- HP\_APAPORT\_KEY (LACP\_AUTO only), 862
- hp\_apaportconf file, 874
- HP/Agilent 58503A, 978
- HP-assigned Support Representative, 654
- HPMC (High Priority Machine Check), 39
- HP-specific monitoring tools, 531
- hpstreams driver, 798
- HP-UX:
  - patches, 642–695
    - Web servers to manage, 1093–1110
  - HP-UX 11i Enterprise Operating Environment, 1322
  - HP-UX 11i Mission Critical Operating Environment, 1230
  - HP-UX 11i Operating Environment, 1034, 1041, 1071
  - HP-UX AAA Server, 1156
  - HP-UX administrator, 4
  - HP-UX, as a multithreaded operating system, 529
  - HP-UX, as onion-skin operating system, 8–9
  - HP-UX Bastille, 1494
    - defined, 1484
    - installing, 1490–1494
  - hpux command, 355, 358
  - HP-UX hardware paths, 55
  - HP-UX Installation Media:
    - emergency recovery using, 759–793
    - recovering:
      - corrupt boot header, including a missing ISL, 760–774
      - from having no bootable kernel, 774–781
      - from a missing critical boot file, 781
      - /stand/rootconf, 781–789
  - HP-UX IPFilter, 1155–1156
  - hpux -is command, 1399
  - HP-UX patch management (PDF), 649
  - HP-UX real-time priorities, 542
    - run queues for, 547–548
  - HP-UX Strong Random Number Generator software, 920
  - HP-UX Support Plus CD/DVD-ROMs:
    - Bundle Matrix, 647
    - Support Plus CD-ROM layout, 648–649
  - HP-UX Timeshare scheduling policy, 549
  - HP-UX Timesharing scheduling policy, 603
  - HP-UX Trusted Systems, 1087–1088, 1369, 1374–1375, 1376–1402
    - disadvantages of using, 1379
    - Division A, 1381
    - Division B, 1380–1381
    - Division C, 1380
    - Division D, 1380
    - enabling/disabling functionality, 1382–1383
    - features of, 1379
    - as measure of HP commitment to operating system security, 1379
  - HP-UX Tuning and Performance* (Sauers/Weygant), 529
  - HP-UX Workload Manager (WLM), 121, 530
- HSSDC (High Speed Serial Direct Connect) connectors, 1123
- HTML, 1107
- htpasswd command, 1107
- httpd command, 1105
- httpd process, 1093–1094
- HyperPlex, 120–121
- I**
- IA-64, 6
  - ICMP packets, 1483–1494
    - warnings regarding, 1482–1483
  - ICMP redirect, 817
  - ICMP redirect message, 817
  - ICMP router advertisements, 890

## 1648 Index

- Ideal server, 698
- Idle state:
  - permanent virtual circuits (PVCs), 1114
  - switched virtual circuits (SVCs), 1114
- IDS\_importAgentKeys command, 1453
- IEEE 802.1p, 1153
- IEEE 802.1Q, 1153
- ifconfig, 856
- Ignite-UX:
  - adding additional software to a Core OS configuration, 720–727
    - setting up software depot(s), 720–722, 722–723
  - updating the index file to reflect the new/nlconfigurations that are now available, 723–725
  - using the new configuration to install a client, 725–727
- installing a complete operating system using, 706–727
- installing software with, 697–758
  - setting up a server to utilize an existing Core OS depot, 707–720
- ikmpd daemon, 1467
- IMPORT option, 619
- importing disk groups, 364–366
- inaddr. arpa, 914–915
- IN-ADDR.ARPA domain, 953
- Incoherent Complex Profile, 82
- index.html, 1100
- inet driver, 798
- Infant mortality rate, 1170
- Infinity metric, RIP, 899
- info command, 501
  - syslogd, 485
- infoolog command, 501
- Information menu, 71–72
- Information Technology Security Evaluation Criteria (ITSEC), 1382
- Informix, 1229, 1276
- Initialized data, 568
- Installed Products Database (IPD), 666
- Installing and Managing HP-UX Virtual Partitions (vPars)*, 128, 130
- Instant Capacity on Demand (iCOD) client product, 647
- Integrated Services Digital Network (ISDN) interfaces, 1112
- Integrity Superdome servers, 7
- Intelligent cluster reconfiguration:
  - after node failure:
    - accomplishing, 1176
- Intercabinet copper, 1123
- Inter-cell communication, 21
- International Atomic Time (TAI), 977
- International Earth Rotation Service, 977
- International System of Units (SI), 977
- Internet Assigned Number Authority (IANA), 813
- Internet Assigned Numbers Authority (IANA), 953
- Internet Corporation for Assigned Names and Numbers (ICANN), 915
- InterNIC, 813, 923
- Inter-Process Communication (IPC), 564–565
  - kernel parameters, 565
- Interprocess communication (IPC) mechanisms, 532
- Intracabinet copper, 1123
- Intrusion, 1155
- IO Bays, 19–20
- IO Cardcage:
  - connections, 56
  - slot numbering, 55–63
- IO cardcages, 15, 23
- IO chassis, 17–18
- IO command, 36, 39
- IO Discovery, 80
- IO expansion cabinet, 23–24
- IO subsystem, 8, 9
- IO tree:
  - applying a new IO tree configuration, 192
  - change in device file names:
    - reworking user/system applications affected by, 197–199
  - create an ASCII file representing, 191
  - current device file:
    - documenting, 190
    - establishing which system and user applications use, 190–191
  - ioinit command, 192–193
  - new device files:
    - checking for correct creation of, 194–197
  - rebooting the system to single user mode, 193
  - reorganizing, 186–200
    - collecting IO trees, 187–189
    - hardware path mapping, 190
    - motivation for, 186
    - removing all old device files, 199–200
    - shutting down the system(s) to single user mode, 191
    - standardized IO tree, deciding on format of, 189–190
    - steps in, 186–187
- IO tree, reorganizing, system recovery tape, 187
- IOFAIL state, 341
- ioinit command, 185, 187, 192–193
- ioscan command, 340, 143–144, 207–208
- ioscan -e command, 61
- ioscan -f command, 187
- ioscan -fnC disk, 340
- iostat command, 531
- IP addresses, 811–814, 912–914, 931
  - classes, 812–814
  - and IN-ADDR.ARPA domain, 953
  - IP version 4 (IPv4), 812
- IP Authentication Header (AH), 1468
- IP multiplexing, 851–853
- IP subnet-based VLAN, 1153
- IP version 4 (IPv4), 811
  - address classes, 812
- IP6.INT, 915
- IP-based load balancing, 859
- ipcclose event, 1395
- ipccreat event, 1395
- ipcdgram event, 1395
- ipccopen event, 1395
- ipcrm command, 567

`ipcs` command, 531, 565  
`ipf` command, 1486–1487  
 IPFilter, 227, 1155  
 iplanet software, 1069  
 IPMI (Intelligent Platform Management Interface), 97  
`ipnodes`, 857  
 IPSec, 459, 1155, 1463, 1465
 

- authenticated or nested ESP, 1469
- Authentication Headers, 1468–1469
- boot-time configuration:
  - setting up, 1475–1476
- Encapsulated Security Payload headers, 1469
- ensuring establishment of Main Mode and Quick Mode SAs, 1477–1482
- filters, 1468
- importing/requesting certificates or configuring preshared keys, 1473–1475
- installing, 1466–1467
- IPSec daemons:
  - starting, 1476–1477
- ISAKMP Main Mode policies:
  - configuring, 1472–1473
- nested ESP, 1470
- policies:
  - configuring, 1467–1468
  - using GUI to configure, 1471–1472
- setting up, 1466–1473
- Tunneling Mode for AH and ESP headers, 1470

 IPSec policies, 1467–1468  
 IPsec/9000, 1155  
 IPv4-mapped IPv6 address, 959–960, 963  
 IPv6, 459, 853–859  
`is_patch` attribute, 663–664  
 ISAKMP, 1468  
 ISL Trunking, 1136  
 ISS (Internet Security Scanner), 1420  
 IT Resource Center (ITRC), 645–646
 

- Candidate Patch List, 646
- Custom Patch Manager (CPM), 645–646
- ITRC User ID, 645

 Itanium, 6, 15  
 ITRC Patch Database, 656

**J**

Java Servlet Proxy, 1496

**K**

`kcalarm` command, 483  
`kcusage` command, 483  
`kcweb`, 473
 

- monitoring kernel resource with, 480–484

`kcweb -s` command, 482, 484  
`kcweb -s stop` command, 484  
 Kerberos authentication, 1035, 1068, 1495, 1496  
`kern` facility, `syslogd`, 485  
 kernel, 7
 

- principle subsystems, 9

 Kernel mode, 10
 

- processes, 537–539

 Kernel stack, 569  
 Kernel states, 340  
 Kernel/volume states, and the Next Step, 342

Key Distribution Center (KDC), 1437, 1495  
 Key name, 964  
 Key server technologies, 5  
`kill` command, 530, 566  
 Kille, S., 1067  
 Kilobyte-striping, 247, 252  
`kminstall -a widedrv` command, 474  
`kmsystem` command, 477  
`kmtune` command, 478, 480  
`kthread` structure, 535

**L**

`L_Port`, 1136  
 LABEL file, 769, 772, 781  
 Labeled security protection, 1380–1381  
 LACP\_AUTO protocol, 863, 867, 870–871, 874, 880  
 LAN cards, testing, 1192–1193  
 LAN Emulation Clients (LEC), 1118  
 LAN Monitor Failover Groups, 870  
 LAN Monitor mode, 859  
`lanadmin` command, 799, 804, 806–808, 809, 865  
`lanapplyconf`, 874, 874–875  
`lancheckconf`, 874  
`lanconfig` file, 876  
`lanconfig.ascii` file, 874, 876  
`landeleteconf`, 874  
 LANICs, 1176  
 LanManager for UNIX, 1034  
`lanqueryconf`, 874  
`lanscan`, 226, 867  
`largefiles`, 382–383  
 Layered volume, 327, 329  
`LC (Lan Config) command (Lan Config) command`, 45, 49  
 LC (Lucent) connectors, 1124  
 LDAP Access Profiles, 1068  
`ldapmodify` command, 1074  
`ldappasswd` command, 1087  
 LDAP-UX Client Services, 1070–1071
 

- step-by-step guide to, 1071–1087

 LDAP-UX Client Services software:
 

- access control identifiers (ACI), 1075–1076
- client profiles:
  - deciding where to store, 1075
- configuring to enable it to locate the directory, 1080–1082
- data migration, 1077
- Directory Services administrator password, 1077
- `/etc/group`:
  - customizing, 1078
- `/etc/passwd`:
  - customizing, 1078
- name service data:
  - configuring a proxy user to read, 1077–1078
  - deciding on location of directory for, 1074–1075
  - importing into directory, 1078–1080
- netscape:
  - access control identifiers (ACI), 1075–1076
- Netscape Directory Service 4.X:

## 1650 Index

- console, 1077
  - POSIX schema:
    - allowing users to read all attributes of, 1076–1077
  - user attributes:
    - allowing read access for proxy user to, 1078
    - restricting write access to, 1075–1076
  - LDAP-UX Integration products, 1070–1071
    - installing, 1071–1072
    - LDAP-UX Client Services, 1070–1071
    - NIS/LDAP Gateway, 1070
  - LDIF (LDAP Directory Interchange Format), 1070
  - Lease expiry time, 828
  - Leased line, 1115
  - lease-grace-period, 832
  - lease-policy, 832
  - lease-time=, 832
  - lifcp command, 357
  - Lightweight Directory Access Protocol (LDAP), 1066
    - adding another client, 1086–1087
    - defined, 1067
    - directories, 1066, 1068–1069
      - schema, 1070
    - directory server, 1069
    - /etc/nsswitch.conf, 1082–1083
    - /etc/pam.conf, configuring to use, 1082
    - LDAP-UX Client Services:
      - step-by-step guide to, 1071–1087
    - LDAP-UX Integration products, 1070–1071
    - LDAP-UX Client Services, 1070–1071
    - NIS/LDAP Gateway, 1070
    - user functionality, testing, 1083–1085
  - Link aggregate, 859
  - Link aggregation control protocol (LACP), 860
  - Link speed and auto-negotiation, 808–811
  - Link-local addresses, 854
  - linkloop command, 800, 1329
  - Link-state routing protocol, 890
  - Listen directive, 1104
  - ll command, 526
  - Load Average, 588
  - Load Average/Run Queue, 589
  - Load balancer, dispatcher as, 1173
  - Load balancing, 859
    - Hot Standby, 859
    - IP-based load balancing, 859
    - MAC-based load balancing, 859
    - port-based algorithm, 859
    - round-robin, 870
  - Local Bus Address (LBA), 56
  - Local clock, 993
  - Local clock impersonator, 993–994
  - Local Director (Cisco Systems), 1173
  - local () facility, syslogd, 485
  - Local Response Center, 654
  - Local timeserver, 979
  - Locality domain, 555–556
  - Location-based access controls, 1390
  - Lockable memory, 453
  - LOCKABLE option, 619
  - Locking a mutex, 532–533
  - Log Plex, 313
  - Logfile:
    - sendmail:
      - monitoring, 1028–1029
    - logger command, 487
  - Logical data receiver packages, 1331
  - Logical data replication, 1329
  - Logical data sender packages, 1331
  - Logical IP Subnet (LIS), 1118
  - Logical Track Group (LTG), 246, 254
  - Logical unit number (LUN), 204–207
  - Logical Volume Manager (LVM), 245–307
    - Alternate PV Links, 286–291
    - disk drive forward compatibility, 299–304
    - LVM mirroring (RAID 1), 254–285
    - LVM striping (RAID 0), 246–253
    - and RAID, 246
    - volume groups, exporting/importing, 291–299
  - login event, 1395
  - Loop Initialization Protocol (LIP), 1128–1129
    - LIP storm, 1128
  - Loop Initialization Protocol (LIP) exchange, 1127
  - Loop port, 1129
  - Loopback FS, 381
  - Los Alamos National Laboratory, 1174
  - lotsfree, 455–457, 593
  - Low-priority sleepers, 549
  - LPID (Last Process ID), 566–567
  - lpmodify command, 1074
  - lpr facility, syslogd, 485
  - LS (Lan Show) command, 49
  - lsacl command, 400
  - LUN masking, 1140
  - lvdisplay command, 209
  - lvlnboot command, 209, 213
  - LVM, 9
  - LVM mirroring (RAID 1), 254–285
    - conclusions about, 285
    - losing a disk online:
      - replacing while system runs, 275–281
      - sustaining reboot before disk replacement, 281–284
    - mirroring vg00, 267–275
    - PVG-strict, 254–267
    - spare volumes, 284–285
  - LVM PV Links, 8
  - LVM striping (RAID 0), 246–253
- ### M
- MA command, 51
  - maabof.com, 916, 1010–1013
  - MAC address:
    - changing, 803–808
      - by rebooting/running lanadmin command manually, 806–808
    - new address, deciding on, 804–805
    - setting up startup configuration file to specify, 805–806
  - MAC-based load balancing, 859
  - Magic number, 570–577, 1440
  - Mail aliases, 1005–1009
  - mail facility, syslogd, 485

- Mail queue:
  - files in, 1027–1028
  - monitoring, 1026–1030
- Mail statistics, 1029–1030
- mailq command, 1026
- mailx, 1002
- Main Control Unit (MCU), 1152
- Main Mode, 1468
- Main Mode Security Associations, 1467, 1477
- Maintenance mode boot, 781
- make\_[tape|net]\_recovery, 187
- make\_config command, 730
- make\_net\_recovery, 744
- make\_recovery, 744
- make\_sys\_image command, 744
- make\_tape\_recovery, 744
- malloc(), 569
- Managing web servers, 1093–1110
- Mandatory protection, 1380
- Man-in-the-middle attack, 1465
- Manually configured port trunks, 860
- map command, 501
- mapfile, 294, 297
- Masquerading, DNS implications, 1005–1009
- Master name server, 915–934
  - configuring, 915–934
  - creating a working directory for the DNS database files, 917
  - creating the DNS database files using the hosts\_to\_named utility, 917–918
  - deciding on a DNS domain name, 915–916
  - delegated:
    - setting up, 945–948
  - effects of a slave on, 940–943
  - helping to set up appropriate hosts file, 944–945
  - named daemon, starting, 927–930
  - official registrars, 915–916
  - registering a DNS domain name, 915–916
  - rndc configuration file, 925–927
  - setting up the resolver configuration files, 928–929
  - testing DNS functionality, 931–934
  - updating the /etc/hosts file, 916–917
- max\_thread\_proc, 535
- maxdsiz, 569
- Maximum share entitlement, 607
- maxssiz, 569
- maxswapchunks, 460
- maxtsiz, 569
- McKusick filesystem, 383
- MC/ServiceGuard, 225
- MDA (Mail Delivery Agent), sendmail as, 1002
- Mean Time Between Failures (MTBF), 1169–1170
- MeasureWare command, 531
- Memory bottlenecks, 593–596
  - hardware solutions to, 595
  - memory metrics indicating, 593–594
  - resolving, 594–596
  - software solutions to, 595–596
- Memory limitations, for 32-bit operating systems, 569–570
- memory line, 461
- Memory management, 9, 10
- Memory Mapped Files, 568, 573
- Memory partitioning, 567–568
- Memory quadrants, 567–568
- Memory self tests, 80
- Memory shares, 618
- Memory windows, 570, 574, 577–580
- Merkle, Ralph, 1439
- Message digest, 1437–1438
- Message integrity check (MIC), 1437
- Messaging Server, 1229
- Metrocluster, 1152, 1310, 1323–1329
  - architectural differences between an Extended Serviceguard cluster and, 1323
  - forms of, 1323
  - fundamental differences between Extended Serviceguard and, 1323
  - Metrocluster/CA, 1323–1324, 1326–1327
  - Metrocluster/SRDF, 1323, 1326
- Metropolitan distances, 1147
- minfree, 455–457, 593
- Mirror Consistency Recovery (MCR), 254
- Mirror Write Cache (MWC), 254
- mirror\_concat layout policy, 324
- MirrorDisk/UX product, 1322–1329
- Mirrored-striped volume, 250
- Mirroring, 254–285
- Missing critical boot file:
  - creating the /stand/rootconf file by hand, 783–789
  - magic label of 0xdeadbeef, 782
  - maintenance mode boot, 781
  - recovering from, 781–789
  - size of the root LV, 782, 783
  - start block address of the root LV, 782
- mkboot command, 357–358, 361
- mknod, 799
- moddac event, 1395
- moddaccess event, 1395
- monconfig command, 490–491, 493
- Monitor daemons, 488
- Monitors, 488
- mpctl() system call, and processor affinity, 556–559
- mpshd command, 143
- msgmap, 565
- msgmax, 565
- msgmnb, 565
- msgmnl, 565
- msgseg, 565
- msgsssz, 565
- msgstql, 565
- MTA (Mail Transport Agent), sendmail as, 1002
- MUA (Mail User Agent), sendmail as, 1002
- Multicast addressing, 855
- Multi-function card, 216
- Multi-homed hosts, 817–818
- Multi-mode fibre, 1123
- Multiprocessor environments, 553–563
  - cc-NUMA, 554–556
  - concurrency in, 562–563
  - Processor Sets, 559–562

## 1652 Index

- Multiprocessor environments and processor affinity,
  - mpctl () system call and processor affinity, 556–559
- Multithreaded applications, 532–533
- Mutex, 533
- Mutual recovery, 1151–1152, 1331
- N**
- N\_Port, 1135
- N\_Port ID, 1132–1133
- Name servers, 912
- Name service data:
  - configuring a proxy user to read, 1077–1078
  - deciding on location of directory for, 1074–1075
  - importing into directory, 1078–1080
- named daemon, starting, 927–930
- Named Response Center Engineer (NRCE), 654
- named.conf file, 933
- namesvrs file, 927
- National Physical Laboratory (UK), 977
- NATTACH, 566–567
- ndd command, 823–824
  - modifying network parameters with, 823–824
- NDS (Novell), 1067
- NEEDSYNC state, 341
- Neighbor Discovery Protocol (NDP), 857
- netconf file, 866–867
- netconf-ipv6 file, 854–855
- netdiagl driver, 798
- netfmt command, 842, 1480
- Netscape:
  - access control identifiers (ACI), 1075–1076
  - setup program, running, 1072–1074
- Netscape Directory Service 4.X, 1074
  - console, 1077
  - installing, 1071–1072
- Netscape Directory Services, 1067
- Netscape Enterprise Server, 1496
- netstat command, 531
- nettl command, 839–843, 1479
- Network address (net ID), 812
- Network Address Translation (NAT), 1490–1494
- Network Attached Storage (NAS), 1121
- Network File System (NFS), 9, 459, 1034
- Network FS, 381
- Network Information Center, 813
- Network Information Service (NIS), 1065–1066
- Network Node Interface (NNI) cell, 1116
- Network Time Protocol (NTP), 975–999
  - authentication, setting up, 991–993
  - broadcast, 987
  - broadcast client, 995–996
  - clients, 987
  - configuration file (/etc/ntp.conf), 978
  - Coordinated Universal Time (UTC), 977
  - different time sources:
    - analyzing, 980–985
  - International Atomic Time (TAI), 977
  - local clock impersonator, 993–994
  - logfile, 996
  - NTP daemons:
    - setting up, 985–987
  - NTP etiquette, 979
  - NTP server relationships, 987–993
  - NTP software, role of, 980
  - peer, 987
  - peer server, setting up, 987–991
  - polling client, 994–995
  - publicly accessible timeservers, 979
  - server, 987
  - slewing time, 996
  - Stratum Levels and timeservers, 979
  - time source, choosing, 978–979
  - worldwide timekeepers table, 976
- Network Tracing and Logging subsystem (nettl), 868
- Networking drivers, 798
- Networking kernel parameters, 798–799
- newaliases command, 1006
- news facility, syslogd, 485
- nfsktcpd process, 535–536, 546–547
- nfsstat command, 531
- nice value, 543, 550–552, 603
- Nifty-54 diagram, 26–27, 84, 96
- NIS/LDAP Gateway, 1070
- nkthread, 535
- NL\_Port, 1129, 1135
- nms driver, 798
- Node Partitionable servers, 14
  - list of current servers, 16
- Node Partitions, 13–126
  - HP-UX hardware addressing on, 57–63
- Node WWN, 1125
- NODE\_NAME, 875
- NODEVICE state, 341
- Non-layered volumes, 329
- Non-redundant volumes, 337–339
- Nonrepudiation, 1437–1438
- NonStop servers, 1164–1165
- Normal executable, 571
- notice facility, syslogd, 485
- nPar, 13, 121, 127
  - basic building blocks of, 15–22
  - basic hardware guide to, 15–16
  - physical configuration, 132
  - running vPars:
    - adding/removing cells to, 157–161
- <N\_Port ID>, 1133
- nslookup command, 931
- nsquery command, 931
- NSS\_LDAP, 1068
- nssshow command, 1131
- nsswitch.conf file, 931
- nsupdate command, 963–964
- nswapdev, 460
- nswapfs, 460
- NT LanManager authentication (NTLM), 1035, 1049
  - domains:
    - user manager for, 1048
  - testing the functionality of NTLM authentication, 1053–1062
  - user map:
    - configuring to reference UNIX users to be authenticated by the NTLM servers, 1052
- NTP daemons, setting up, 985–987

NTP etiquette, 979  
 NTP server relationships, 987–993  
 NTP software, role, 980  
 ntp0.cs.mu.OZ.AU, 981  
 ntpl.gbg.netnod.se, 988  
 ntp-cup.external.hp.com, 981  
 ntpdate command, 980, 985, 996  
 ntp.metas.ch, 981  
 ntpq command, 986  
 ntpsl-0.cs.tu-berlin.de, 988  
 ntptrace command, 985

**O**

ObAM-Apache web server, 1094–1102  
     browser plug-in, 1102  
     Partition Manager, 1101  
         default web page, 1102

Object Action Manager framework, 1095

OFFLINE state, 341

Offset, 449  
 offset command, 986  
 offset (time difference) column, 984

OLA/R, *See* Online Addition and Replacement (OLA/R)

olrad command, 212

One-package configuration, Serviceguard extension for SAP, 1361

Onion-skin operating system, 8–9

Online Addition and Replacement (OLA/R), 8, 98, 117, 208–228  
     adding a new PCI card, 226–228  
         motivation for using, 209  
     replacing a failed PC card, 209–226  
         identifying the failed PCI card, 211–212  
         performing Critical Resource Analysis on the affected PCI card, 213–215  
     replacing a failed PCI card:  
         checking functionality of the newly replaced PCI card, 225–226  
         checking the power domain, 216  
         multi-function card, 216  
         replacement procedure, 223  
         resuming the driver for the PCI slot, 224–225  
         running associated driver scripts before resuming the driver, 224  
         running associated driver scripts before suspending the driver, 217–218  
         suspend the kernel driver for the affected PCI slot, 219–222  
         turning off the attention light for the affected PCI slot, 226  
         turning off the power to the affected PCI slot, 222–223  
         turning on the attention light for the affected PCI card slot, 215–216  
         turning on the power to the PCI slot, 223–224

Online de-fragmentation, 414–416

Online JFS features, 409–414  
     controlling synchronous IO (convosync=), 429–430  
     logging levels used by the intent log, 416–420

    online de-fragmentation of, 414–416  
     upgrading an older VxFS filesystem, 409–414

open event, 1395

Open mutex, 533

Open SAN, 1139

Open Shortest Path First (OSPF), 900–906

Optical GBICs, 1123–1124

Oracle, 1166, 1229, 1276

Oracle 8i Standby Database, 1331

Oracle Parallel Server, 1329

Oracle Standby Database, 1229

Oracle Toolkit, 1276

Orange Book standard, 1379–1382

Organization units, 1069

Organizational units, 1074

OSPF, 890

ospf\_monitor, 906

**P**

Package control script, 1230

Package-less cluster, 1177  
     setting up, 1182, 1193–1217

Packet switching, 1112

Packet-switching technologies, 1112

Page Directory (PDIR), 7, 450–451, 451

Page Frame Data Table (pfdat), 451

Page outs, 593

Page-ins, 448

Page-out rate, and memory bottlenecks, 593

Page-outs, 448

Paging systems, 7

PAM, *See* Pluggable Authentication Modules (PAM):

PAM framework, 1051

PAM\_LDAP, 1068

PANIC, 505, 518–523

Parallel Detection, 809

parcreate command, options, 88–90

pardisplay command, 214

PA-RISC, 15

Parity data, 236

parmodify command, 76–78, 99–100  
     -B option, 99–100, 108

PARPERM command, 97

parstatus command, 61, 84, 88

Partition attributes, changing, 167–171

Partition configuration, basic goals of, 16–17, 20, 24

Partition Configuration Data (PCD), 34

Partition Manager, 83–109, 1094, 1095  
     adding a cell to partition, 107–108  
     boot actions, 115–117  
     boot paths, 86  
     deleting a partition, 108–109  
     existing partitions, modifying, 97–107  
     host-based GUI, 85  
     instigating a crashdump in a hung partition, 113–114  
     minimum requirements for a partition, 84  
     powering off components, 117–120  
     reboot-for-reconfig, 110–112  
     rebooting/halting a partition, 110  
     resetting a partition, 112–113  
     web-based GUI, 84

## 1654 Index

- Partition Manager software, 73
- Partition name, 86–87
- Partition rendezvous, 82
- Partitionable servers, 16
- Partitioned servers, 4
  - Node Partitions, 13–126
  - Virtual Partitions, 127–184
- Partitioning continuum initiative (HP), 14
- Partitioning, key benefits of, 14
- Partitions, attributes, changing, 167–171
- `parunlock` command, 101
- Password History Database, 1402
- Password-based authentication, 1068
- Patch bundle depots, 649
- Patch bundle readme files (text), 649
- Patch depot:
  - managing, 689–692
  - setting up, 669–678
    - process of, 672–678
- Patches:
  - ancestry, 667–669
  - applied, 666
  - attributes, 663–669
    - ancestor fileset, 664
    - `applied_patches` attribute, 664
    - `patch_state` attribute, 667
    - state attribute, 666
  - committed, 666
  - committing, 685–688
  - defined, 642
  - filesets, 663–664
    - states, 666
  - General Release patch, 642
  - General/Special recalled patch, 643
  - General/Special Superseded patch, 643
  - installing, 678–684
    - from a patch-only depot, 678–680
    - from a software-and-patches depot, 681–684
  - ITRC Patch Database, 656
  - naming convention, 654–655
  - obtaining, 645–654
    - HP online Software Depot, 649–654
    - HP-assigned Support Representative, 654
    - HP-UX Support Plus CD/DVD-ROMs, 647–648
    - IT Resource Center (ITRC), 645–646
    - local Response Center, 654
  - patch usage models, 643
  - products, 663–664
    - states, 666
  - purpose of, 642
  - rating updates, 656
  - ratings, 655–656
  - removing, 684–685
  - right time to patch a system, 643
  - risks involved when applying, 644–645
  - `shar` file, 657–663
    - Special Installation Instructions, 657–660
  - `show_patches` command, 665
  - Special Release patch, 643
  - superseded, 666
    - with warnings, 656
- Patching:
  - common reasons for, 643–644
  - proactive, 644
- Patch-only depot, 681
  - installing patches from, 678–680
- `PATH HAA <path>` command, 76
- `PATHFLAGS`, 78–80, 90, 97, 115–117
- `pax`, 1374–1375
- Payload rate, 1148
- PCI-X interface, 8
- PC-Offset Stack Trace, 522
- PDCA (Power Distribution Control Assembly) units, 120
- `pdcinfor`, 509
- PDH (Plesiochronous Digital Hierarchy), 1117
- `pduin`, 841
- `pduout`, 840
- `pdweb` command, 212
- PE command, 80, 119–120
- Peer, 987
- Perfect Forward Secrecy (PFS), 1440, 1468, 1472–1473
- Performance Optimized Page Sizes (POPS), 7–8, 580–585
  - conclusions about, 585
  - defined, 580
  - using `chatr`, 582–585
  - using `vps_ceiling` and `vps_pagesize`, 582
- Peripheral Status Monitor (PSM), 489
- Permanent virtual circuits (PVCs), 1113, 1114–1115
- Permanent Virtual Connections (PVC), 1116
- Persistent FastResync, 350
- `pfdat` structure, 451
- PGP (Pretty Good Privacy), 1495
- Phantom mode, 1129
- Phantom Mode, 1129
- `PHCO_24630`, 665
- `PHCO_27101` patch, 358, 362
- Physical Addresses, 7–8, 450
- Physical data replication, 1329
- Physical Extents, 254
- Physical memory, 453
- Physical Page Number (PPN), 450
- PIM (Processor Information Module), 509
- `ping` command, 531, 856, 1043
- PKI (Public Key Infrastructure), 1156
- Plaintext, 1434
- Plain-text attack, 1440
- Plex, 312–314
- `plock ()` system call, 453
- Pluggable Authentication Modules (PAM), 1047–1052, 1071, 1496
- PMD (Physical Medium Dependant sub-layer), 1116
- Point-to-Point topology, 1127
- `poll` (poll period) column, 984
- `POLLING_INTERVAL`, 875
- Pool group, 831–835
- `pool-name=`, 831
- `<Port ID>`, 203
- Port WWN, 1125–1126
- Port-based algorithm, 859
- Port-based VLAN, 1153
- POSIX real-time policy:

- run queues, 544–546
    - SCHED\_FIFO, 544, 546
    - SCHED\_RR, 544
    - SCHED\_RR2, 544
  - POSIX real-time priorities, 541–542
    - run queues for, 547–548
  - POSIX schema, allowing users to read all attributes of, 1076–1077
  - post\_replace, 224
  - Power-On Self Test (POST), 80–81
  - PP-Fabric, 1130
  - Practical UNIX and Internet Security* (Garfinkel/Spafford), 1425
  - Precision Architecture (HP), 5–7
  - Predictive Support, 649
  - Preferred plex read policy, 325
  - Pregions, 451, 457
  - prep\_replace, 224
  - Preshared keys, 1468
  - Primary Authentication, 1466
  - Primary boot path, 75, 86, 94, 115, 170, 760
  - Primary Domain Controller, 1034–1035
  - Primary interface address, 854
  - Primary server, 915
  - PRIMARY/STANDBY, 875
  - Principal Switch, 1141
  - Priority Queue, 587, 588–589
  - Priority ranges, 541–542
  - Private key, 1435, 1438
  - Private LAN, 32–33
  - Private loop devices, 1128–1129
  - Private network, defined, 1154
  - Private region, 313, 329, 337
  - PRM, *See* Process Resource Manager (PRM):
    - PRM command, 531
    - prmonitor command, 605
  - Proactive patch analysis, 654
  - Proactive patching, 644, 645
  - process event, 1395
  - Process management, 9
  - Process Resource Manager (PRM), 121, 530, 562, 1177
    - application records, 608–614
      - capping, 605–606
      - defined, 622
      - prioritizing workloads with, 601–622
    - Processor Sets, 614–618
      - share entitlement, 601–605
      - shares, 602
      - simple configuration to manage CPU shares, 602–618
      - thread scheduling and, 614
        - using to prioritize memory shares, 618–622
  - Process Thread List, 535–536
  - Processes:
    - common bottlenecks to, 586–601
      - CPU bottlenecks, 587–592
      - disk bottlenecks, 596–600
      - memory bottlenecks, 593–596
    - compared to threads, 534
    - defining, 530–536
    - generic UNIX monitoring tools, 531
    - HP-specific monitoring tools, 531
    - kernel mode, 537–539
    - memory requirements for, 563–569
    - multiprocessor environments, 553–563
      - cc-NUMA, 554–556
      - concurrency in, 562–563
      - processor sets, 559–562
    - multiprocessor environments and processor affinity:
      - mpctl () system call and processor affinity, 556–559
    - priorities, 541–553
      - HP-UX real-time priorities, 542
      - POSIX real-time priorities, 541–542
      - system timeshare priorities, 542–543
      - timeshare priorities, 542–543
      - user timeshare priorities, 543
    - process life cycle, 537–540
      - tools for monitoring, 530–531
      - user mode, 537–539
  - Processor affinity, 556–559
  - Processor architecture, 5–7
  - Processor Information Module (PIM), 172
  - Processor Set, 121
  - Processor Sets, multiprocessor environments, 559–562
  - Program magic number, 570–577
  - Progress (Sybase), 1229, 1276
  - Promiscuous ARP, 825–826
  - Propagation delay, 1144
  - Protocol-based VLAN, 1153
  - Proxy ARP, 825–826
  - Proxy Server, 1229
  - Proxy server, 1495
  - PS command, 37, 39, 55, 62
  - ps command, 531
  - pseudo-swap, 455
  - psmctd daemon, 489
  - psmmon daemon, 489
  - psrset command, 561
  - pstatus command, 989
  - pthread\_kill system call, 534
  - PTIMESHARE, 547
  - PTR records, 914
  - PTTOPT\_Fabric, 1130
  - Public key, 1435–1436, 1438
  - Public keys, 1468
  - Public loops devices, 1128–1129
  - Public-key cryptography, 1156, 1438
  - puma command, 531
  - pwget command, 1087
- ## Q
- q4pxdb command, 515
  - Q-compliant switches, 1153
  - QL\_Port, 1136
  - Quadrants, 449–450
  - quad-speed slots, 55–56
  - quick keyword, 1486–1487
  - Quick Mode Security Associations, 1467, 1477
  - Quickloop, 1129
  - Quorum Server, 1185, 1232, 1309

## 1656 Index

### R

- R option, shutdown command, 62
- rad -a command, 217
- rad -c command, 225
- rad command, 61, 224–226
- rad -h command, 217
- rad -v command, 218
- Radio receiver, 978
- RADIUS (Remote Authentication Dial-In User Service), 1496
- RAID (Redundant Array of Inexpensive Disks):
  - defined, 235
  - AND operator:
    - truth table for, 238–239
  - OR operator:
    - truth table for, 239
  - parity data, 238–241
  - RAID 0, 236
  - RAID 1, 237
  - RAID 2, 237
  - RAID 3, 237–238
  - RAID 4, 238
  - RAID 5, 238
    - parity calculation, 240
    - XOR parity data in, 240
  - RAID levels, 235, 236–238
  - software RAID, 246, 310, 312
  - XOR operator:
    - truth table for, 239
- Rainbow Series, 1379
- Random numbers, and crypto-systems, 1441
- Rank/Echelon, 39, 66
- RARP protocol, 797, *See* Reverse Address Resolution Protocol (RARP)
- rarp command, 826–839
- RC interface, 22
- rcp, 1423
- reach (reachability) column, 984
- readdac event, 1394
- read-modify-write, 240–241, 332
- reboot command, 110, 113
  - H option, 110–111
  - R option, 34, 110–111
- reboot-for-reconfig, 34, 62, 102, 108
- RECONFIGRESET command, 112
- Reconfigure fabric link service, 1137
- RECOVER state, 339, 341
- Recovering crashed HP-UX systems, 759–793
  - corrupt boot header, including a missing ISL, 760–774
    - from having no bootable kernel, 774–781
    - from a missing critical boot file, 781–789
- Recovery Archive, 744–756
  - allowing clients access to the configuration files, 745
  - ensuring clients use up-to-date recovery commands, 745–756
    - make\_net\_recovery, 744
    - make\_recovery, 744
    - make\_tape\_recovery, 744
- Recovery Media, 1382, 1385, 1400
- Recovery Shell, 698, 759, 768, 777–779, 781, 784–785, 1382, 1400
- refid (reference identification) column, 983
- relay operation, 367
- Relocatable IP address, 1176
- Remote Account Support Engineer (RACE), 654
- Remote Authentication Dial-In User Service (RADIUS) protocol, 1156
- Remote Control Unit (RCU), 1151–1152
- Remote Operations Agent software, setting up on each client machine, 701–705
- Remote Operations GUI, setting up on the depot server, 705
- remote (server name) column, 983
- remote\_nfs\_swap, 460
- removable event, 1395
- REMOVED state, 341
- remsh, 1423
- renice command, 550–551
- Replica Server, 1087
- reserve line, 461
- Reserving swap space, 454–455
- RESET command, 113
- resls command, 490–491, 524
- Resource Partitions, 121
- Resource records (RR), 915
  - slave server, 934
- Resources, 488–489
- Response Center Network Specialist, 797
- restore, 382
- Restricted partition management, 97
- resyncfromreplica option, vxassist command, 349
- Resyncing a snapshot, 348
- Reverse Address Resolution Protocol (RARP), 797, 826–828
  - defined, 826
  - limitations, 827–828
- Reverse lookup, 914
- Reverse resync, 349
- rexec, 1423
- ri option, parcreate command, 88
- RIO/REO/Grande cables, 18
- RIP, 890
- RIP-II, 890
- RISC architecture, 10
  - key characteristics of, 6
- Rising-tide allocation policy, 626
- Ritchie, Dennis, 383
- rlogin, 1423
- rm command, 488, 526
- rndc configuration file, setting up, 925–927
- rndc utility, 926, 928, 933
- rndc-confgen utility, 925
- Rolling Standby cluster, 1183, 1275
- Rolling upgrades within a cluster, 1307–1309
- Rootability, defined, 350
- rootconf file, 781–783
- rootdg, 314–315, 357
- Rope number, 56
- Rope Units, 57
- Round robin read policy, 324–325

- Round-robin load balancing, 870
- `route` command, 822, 825, 889–890
- Router Discovery Protocol (RDP), 892–897
  - client mode, 894–897
  - conclusions about, 897
  - server mode, 892–894
- `routerdiscovery` packets, 897
- Routers, 811
- Routing, 811
- Routing Chips (RC), 21
- Routing Information Protocol (RIP), 897–900
  - conclusions about, 900
- Routing table, 811
- Royal Greenwich Observatory, 977
- `RR` command, 111–112
- `RS` command, 113, 171, 1399
- RSA Data Security, 1435, 1439
- RSA-160, 1435–1436
- `rtprio` command, 543, 548–549, 603
  - accessing, 549
- `rtsched` command, 543, 544, 547–548, 603
- `ru` command, 495
- Run queues:
  - defined, 543–544
  - for HP-UX real-time priorities, 547–548
  - POSIX real-time policy, 544–546
    - `SCHED_FIFO`, 544, 546
    - `SCHED_RR`, 544
    - `SCHED_RR2`, 544
  - for POSIX real-time priorities, 547–548
  - and scheduling policies, 543–553
  - for timesharing priorities, 553
- Runnable thread, compared to running threads, 537–539
- S**
- Salt, 1377
- SAMBA, 1034
- SAP, 1166
- `sar` command, 531
- SATAN (Security Administrator Tool for Analyzing Networks), 1420
- `savecrash` command, 514, 523
- `/sbin/ioinitrc`, 190
- `sc` command, 501
- SC (Standard) connectors, 1124
- `SCHED_NOAGE`, 552–553
- Scheduling allocation domains, 555–556, 559
- Scheduling policies, 542
  - and run queues, 543–553
- <SCSI address>, 203, 1134
- SCSI logical unit number (LUN), 204–205
- SDH (Synchronous Data Hierarchy), 1117
- `SEARCH` command, 70
- `SEARCH LAN INSTALL` command, 70
- Secondary interface addresses, 854
- Secondary server, 915
- `secpolicyd`, 1467
- Secret Key Transaction Authentication for DNS (TSIG) (RFC2845), 925–926
- Secret keys, 1435, 1466
- Secret writing, art of, 1434–1435
- Secure Shell (SSH), 1441–1446
- Secure Socket Layer (SSL), 1068
- Secured network environment, critical security elements, 1154–1155
- Security administration tasks, 1369, 1407–1431
  - user-level security settings, 1370–1376
- Security Association (SA), 1467
- Security domains, 1381
- Security Parameter Index (SPI), 1467, 1469
- Security threats:
  - common security administration tasks, 1407–1425
    - buffer overflow problems, avoiding, 1417–1419
      - `/etc/passwd` file, checking content and structure of 1408
      - `write` command, disabling use of, 1409–1410
    - HP-UX privileges, disabling/enabling, 1416–1417
    - enforcing a policy that disables inactive accounts, 1411
    - password aging, enforcing, 1413–1414
    - ensuring login sessions have automatic lock or logout facility enabled, 1408–1409
    - ensuring `root` has secure home directory, 1408
    - `/etc/inetd.conf`, reviewing regularly, 1420–1422
    - maintaining a paper copy of critical system logfiles and configuration details, 1414–1415
    - monitoring the system for SUID/SGID programs, 1416
    - penetration tests, running, 1420
    - installed software components, periodically verifying integrity of, 1415
    - ARP cache, populating with permanent entries, 1422–1423
    - logfiles associated with login activities, regularly monitoring, 1411
    - computer rooms, reviewing accessibility to, 1424–1425
    - reviewing need to support other network services, 1423–1424
    - user-level equivalence for common network services, reviewing, 1423
  - scrubbing data disks/tapes at disposal, 1424
  - security bulletins, keeping up with, 1419
  - restricted shells, using for non-root users, 1410–1411
    - `/var/adm/inetd.sec` file, using extensively, 1420–1422
  - dealing with, 1369–1431
    - `/etc/default/security` configuration file, 1402–1407
- Security tools, 1433–1499
  - bastion host, 1495
  - DCE (Distributed Computing Environment), 1496

## 1658 Index

- DMZ, 1494–1495
- firewalls, 1495
- Host Intrusion Detection System (HIDS), 1446–1463
- ICMP packets, 1483–1494
- Kerberos, 1495
- PGP (Pretty Good Privacy), 1495
- Pluggable Authentication Modules (PAM), 1496
- proxy server, 1495
- RADIUS (Remote Authentication Dial-In User Service), 1496
- Secure Shell (SSH), 1441–1446
- SSL (Secure Sockets Layer), 1496
- tcpwrapper, 1496
- VirtualVault, 1495–1496
- VPN (Virtual Private Network), 1495
- X.509 v3 certificates, 1496–1497
- SecurityMon, 1379
- Seed, 1377
- Selected plex policy, 325
- semaem, 565
- Semaphores, 563–564
- Semi-Distributed volume, 248
- semmap, 565
- semnml, 565
- semnns, 565
- semnu, 565
- semvmx, 565
- sendmail, 1001–1032
  - ensuring installation of, 1003–1004
  - logfile, monitoring, 1028–1029
  - mail aliases, 1005–1009
  - mail queue:
    - files in, 1027–1028
    - monitoring, 1026–1030
  - mail statistics, 1029–1030
  - masquerading, 1005–1009
  - sendmail.cf file, 1001
  - sendmail.st file, 1029
  - simple mail cluster configuration, 1013–1020
  - site hiding, 1005–1009
  - spamming, 1001
  - using without using DNS, 1004–1005
  - version 8.11.1, 853
- sendmail -bi command, 1006
- sendmail -q command, 1026
- sendmail.cf file, building, 1020–1026
- Server complex, 13, 15
  - three single points of failure in, 30
- Server Message Blocks (SMB), 1033
- Server mode, Router Discovery Protocol (RDP), 892–894
- ServerAdmin dir, 1104
- Serverless backups, 1120, 1173
- ServerNet (Tandem), 1173
- ServerRoot, 1095
- Servers, 5, 14
- Service Control Manager (SCM), 931, 1095
  - defined, 700
- Service Control Manager (SCM) depot, making available on the depot server, 700–701
- Service Level Agreements (SLAs), 622, 1164–1165, 1362
- Service Level Objectives (SLO), 601, 626
- Service Process rules, 1231
- Service processes, 1227
- SERVICE\_CMD, 1230–1232
- SERVICE\_NAME, 1227, 1230–1231
- Serviceguard, 489, 622, 875, 1174
  - defined, 1218
  - and High Availability Clusters, 1174–1178
  - software, installing, 1332–1333
- Serviceguard cluster, *See also* Extended Serviceguard cluster:
  - adding a new package to the cluster using a Serviceguard Toolkit, 1275–1292
  - adding a node to a package, 1273–1275
  - adding a node to the cluster, 1269–1273
  - application failure, 1183
  - application monitoring scripts, distributing to relevant nodes in cluster, 1278
  - ASCII package control file (cmcheckconf):
    - checking, 1281
  - ASCII package control script (cmmakepkg -s):
    - creating/updating, 1278–1279, 1280–1281
    - manually distributing to all relevant nodes, 1281
  - basics of a cluster, 1183–1186
  - basics of a failure, 1182–1183
  - Cluster Manager, 1183
  - configuring packages in, 1225–1266
  - constant monitoring, 1217–1218
  - deleting a node from, 1302–1307
    - Check the updated ASCII cluster configuration file (cmcheckconf), 1306
    - check updates were applied successfully (cmviewcl), 1307
    - compile/distribute binary cluster configuration file (cmapplyconf), 1306–1307
    - ensure no packages run on node (cmviewcl), 1302–1303
    - obtain up-to-date version of ASCII cluster configuration file (cmgetconf), 1305
    - remove node as adoptive node from configured packages, 1303–1305
    - update the ASCII cluster configuration file to remove entry for node to be deleted, 1305
  - deleting a package from the cluster, 1301–1302
  - ensure package was removed successfully (syslog.log), 1301
  - halt the package (cmhaltpkg), 1301
  - remove package definition from binary cluster configuration file (cmdeleteconf), 1301
  - review remaining cluster activity (cmviewcl), 1301–1302
- failure of all LAN communications, 1183
- managing, 1267–1318
- modifying an existing package to use EMS resources, 1292–1300

- Network Manager, 1183
- Package Manager, 1183
- package monitoring scripts, creating, 1277–1278
- package switching, ensuring enablement of, 1285–1286
- packageless cluster:
  - setting up, 1193–1217
  - setting up/testing, 1226
- rolling upgrades within a cluster, 1307–1309
- setting up, 1181
- shared files/programs, ensuring loading of on
  - shared disk drives, 1283
- split-brain syndrome, 1186
- starting the package, 1284–1285
- testing package failover functionality, 1286–1292
- total system failure, 1183
- typical cluster management tasks, 1268–1269
- updated binary cluster configuration file,
  - distributing (cmapplycomf), 1282
- Serviceguard Extension for SAP, 1360–1361
- Serviceguard Extensions for Oracle Real Application Clusters (RAC), 1360
- Serviceguard Manager:
  - cluster modifications, 1268
  - Cluster Property Sheet, 1313
  - drag-and-drop capability, 1314
  - installing/using, 1310–1315
  - package management, 1312, 1315
  - package modifications, 1268–1269
- Serviceguard NFS Toolkit, 1230
- Serviceguard OPS edition, 1310
- Serviceguard package:
  - application IP address, 1227
  - application monitoring scripts, distributing to
    - relevant nodes in cluster, 1237
  - application processes, 1227
  - application startup script, 1230–1231
  - ASCII application configuration file
    - (cmmakepkg -p):
      - creating/updating, 1237–1243
    - ASCII package control file (cmcheckconf):
      - checking, 1248–1249
    - ASCII package control script (cmmakepkg -s):
      - creating/updating, 1244–1247
      - manually distributing to all relevant nodes, 1247–1248
  - how it works, 1227–1229
  - LVM volume group/VxVM disk group, 1227
  - package control file:
    - components of, 1228–1229
    - configuring, 1227–1228
  - package monitoring scripts, creating, 1234–1237
  - package startup and halt script, 1228
    - configuring, 1228
  - package switching, ensuring enablement of, 1253
  - service processes, names of, 1228
  - shared files/programs, ensuring loading of on
    - shared disk drives, 1250
  - starting, 1250–1253
    - AUTO\_RUN, 1250–1251
    - NODE\_SWITCHING, 1250
    - testing package failover functionality, 1254–1263
      - Standard Tests, 1254–1258
      - stress tests, 1258–1263
- Serviceguard Toolkits, 1217, 1225, 1229–1232
  - setting up packages in:
    - cookbook for, 1226
- Service-level agreements (SLAs), 1168
- Session key, 1440
- setboot command, 214
- setmemwindow command, 579
- setprivgrp command, 549, 561
- setup program:
  - Netscape:
    - running, 1072–1074
  - 700SUPPORT command, 762
- Severity, events, 489–490
- SFF (Small Form Factor) connectors, 1124
- Shadow password file, 1378–1379
- ShadowPassword, 1378–1379
- Share entitlement, 601–605, 618, 623
  - maximum, 607
- Shared executable, 570
- Shared libraries, 564, 569
- Shared memory, 569
- Shared memory segment identifiers, 564
- Shared memory segments, 564
- Shared objects, 570–574
- Shared transport, defined, 1127
- SHLIB\_PATH environment variable, ensuring
  - setup of, 1074
- shmctl() system call, 453
- SHMEM\_MAGIC executable, 573, 575, 579
- shminfo utility, 579
- shmmax, 565
- shmmni, 565
- shmseg, 565
- shutdown command, 34, 99–100, 110
- shutdown -RH now command, 63
- shutdown-for-reconfig, 101
- sig\_named command, 933
- sig\_named dump, 925
- SIGCHLD signal, 539
- Signal-handling thread, 534
- Simple Authentication and Security Layer (SASL), 1068
- Simple mail cluster configuration, 1013–1020
  - conclusions about, 1019–1020
  - configuring clients to forward all mail to the
    - mail server (hub), 1016–1017
  - configuring clients to mount /var/mail
    - directory from the mail server, 1018
  - ensuring client machine access to the /var/mail/nldirectory, 1015–1016
  - ensuring configurator of all usernames on the
    - mail server, 1015
  - mailq command, 1026
  - sendmail.cf file, 1013–1015
    - building, 1020–1026, 1029
    - setting up the mail hub, 1013–1020
    - test sending an email to another user, 1018–1019
- Simple Name Service (SNS), 1131–1132
- Single Board Computer Hub (SBCH), 28

## 1660 Index

- Single Points of Failure (SPOF), 934, 1166–1167
  - application failure, 1166
  - disk failure, 1166
  - human error, 1167
  - interface card failure, 1166
  - loss of data center, 1167
  - loss of power, 1166
  - network failure, 1166
  - operating system crash, 1166
  - SPU failure, 1166
- Single System Image (SSI), 1174
  - boundary concept, 1174
- Single-mode fibre, 1122–1123
- Single-point-of-failure (SPOF), 209
- Single-server solutions, 5
- Site hiding, DNS implications, 1005–1009
- Site-local addresses, 854, 857
- 64-bit, 10
- SL command, 81–82, 123
- Slave server:
  - delegated:
    - setting up, 948
  - resource records, 934
  - setting up, 934–935
- Slewing time, 996
- Slot-ID, 55
  - numbering convention, 20
- SMB, *See* Common Internet Filesystem (CIFS/9000):
  - smclient command, 1040
  - smclient utility, 1036
  - smb.conf file, 1052
    - configuring to reference the NTLM server, 1052
  - smbpasswd file, 1041
- Smith, Mark, 1067–1068
- snapabort command, 350
- SNAPATT state, 341
- SNAPDONE state, 341
- snapstart command, 346–347
- SNIA (Storage Network Industry Association), 1151
- SO command, 45, 97
- Soft reset, 171
- Soft zoning, 1140–1141
- Software Distributor, 672, 676, 698, 774
  - control scripts, 735
  - installing software with, 697–758
  - operation, 666
- Software partitioning, 127–128
- Software RAID, 246, 310, 312
- Software support call, 504, 522
- Software-and-patches depot, 681
  - installing patches from, 681–684
  - setting up on the depot server, 699–700
- SONET (Synchronous Optical NETwork), 1117, 1119
- SONET/SDH, 1117
- Space ID, 449
- Space Registers, 450
- Spamming, 1001
- Spanning Tree Algorithm, 1176, 1185
- spcl.maabof, 1011
- Special machines, 912
- Special Release patch, 643
- Special software, 912
- Spectracom Netclock/2 WWVB terrestrial radio receiver, 978, 980
- Spinlocks, 563
- Split-brain syndrome, 1186
- Spoofing, 1422
- sr command, 495
- SSH (Secure Shell), 459
- SSL (Secure Sockets Layer), 1496
- st (stratum) column, 983
- Stable Complex Configuration Data (SCCD), 33, 100–101
- Stable Storage, 760
- STALE state, 341
- Standards, 1122
- Standby LAN cards, 1176, 1185
  - /stand/ioconfig, 190
  - /stand/rootconf file, 781–789
  - /stand/vmunix, 129
  - /stand/vpdb, 129
  - /stand/vpmon, 129
- StartServers directive, 1098
- State table, IPFilter kernel, 1487
- Static routes, 816–818, 821, 889
- STATIONARY\_IP, 875
- STATIONARY\_IP, 1184
- Steal hand, 457, 593
- Stealing a page, 457
- Stealth mode, 1129
- Storage Area Network (SAN), 1112, 1120–1121
- Storage clusters, 1173
- Storage Network Industry Association (SNIA), 1151
- Stratum Levels, and timeservers, 979
- Stratum-1 servers, 981–985
- Stress tests, 1258–1263
  - kill one of the major application processes, 1258–1260
  - kill the application monitoring script, 1260–1263
- Striped Pro volume, 330
- Stripe-mirror volume, 328–330
- Striping, 246–253
- Strong Random Number Generator software, 920, 1441, 1464
- Structured protection, 1381
- Subdisks, 312, 314
- Subdomain, delegating responsibility for, 912–913
- Subnet mask, effect of, 815
  - subnet-mask=, 832
- Subnetted network, planning document for, 815
- Subnetting, 814–816, 854
- Subordinate Switches, 1141
- Subvolumes, 328
- Superdome, 120
  - cabinet numbering in, 24
  - cell board, 17
  - complex, 23
- Superseded patches, 666
- Supersession chain, 642
- Support Management Station (SMS), 32
- Support Plus CD/DVD, 489
- Support Plus users guide (PDF), 649
- Support Tool Manager (STM), 647, 649

- Support Tools Manager (STM), 473, 484, 489, 494–504
  - SUPPRESS option, 618
  - swagentd, 1492
  - swagentd.log, 697
  - Swap devices, 448
    - configuring additional, 459–461
  - Swap space, 447–472
    - configuring, 458–459
    - requirements, 448–449
    - reserving, 454–455
  - swapinfo command, 461
  - swapmem\_on, 460
  - swap-mem\_on kernel parameter, 455
  - swapon command, 460
  - swchunk, 460
  - swcopy command, 666
  - swinstall, 1034
  - swinstall command, 666, 672, 697, 1041
    - using to push software across the network, 698–706
      - to remote clients, 705–706
      - Remote Operations Agent software, setting up on each client machine, 705
      - Remote Operations GUI, setting up on the depot server, 705
      - Service Control Manager (SCM) depot, making available on the depot server, 700–701
      - software-and-patches depot, setting up on the depot server, 699–700
  - swintsall, 227
  - Switched Fabric, 1126–1127, 1129–1135
    - data replication over long distances, 1149–1151
    - defined, 1129
    - extended fabrics, 1143–1145
    - Fibre Channel bridges, 1147–1149
    - installing your own fibre, 1146–1147
    - mutual recovery, 1151
    - N\_Port ID, 1130–1135
    - SANs and port types, 1135–1139
    - zoning and security, 1139–1143
  - Switched virtual circuits (SVCs), 1113, 1114
  - Switched Virtual Connections (SVC), 1116
  - swlist command, 362, 664
  - swremove command, 689–690, 697, 874
  - Sybase, 1229
  - Symmetric key, 1435
  - Symmetrical Multi-Processor (SMP), 10
  - SYNC state, 341
  - Synchronous Data Hierarchy (SDH), 1119
  - Synchronous vs. asynchronous data replication, 1149
  - syslog facility, 485, 957–958
  - syslog logfiles, managing, 488
  - syslogd, 485–488
    - facility and level definitions, 485
    - logfiles, managing, 488
  - syslog.log, 212, 226
  - SYSREV command, 43
  - System Area Network (SAN), 1173
  - system backplane, 17–18
  - System backplane, 21–22
  - System Bus Adapter (SBA) chip, 56
  - System call, 10
  - System recovery tape, 187
  - System resources:
    - general system activity and events: monitoring, 484–504
    - kcweb: monitoring kernel resource with, 480–484
    - monitoring, 473–527
    - syslogd, 485–488 logfiles, managing, 488
- T**
- t (types) columns, 983
  - Tag-aware devices, 1153
  - Tagged VLANs, 1153
  - TapeSilo zone, 1140
  - tar, 382, 526, 1374–1375
  - TC command, 113–114, 171, 505
  - TCB, *See* Trusted Computing Base (TCB):
  - tcpwrapper, 1496
  - TCS (Transmission Convergence Sub-layer), 1116
  - TDM (Time Division Multiplexing), 1116
  - TE command, 55
  - Technical Account Manager (TAM), 654
  - Technology Inf, 1171
  - telnet, 1468
  - TEMP state, 341
  - Terminal control database, 1387
  - Test sending an email to another user, 1018–1019
  - Testing critical hardware, 1189–1193
    - disk drives, 1189–1192
    - LAN cards, 1192–1193
  - testparm utility, 1036
  - Thompson, Ken, 383
  - Thrashing, 455, 457, 459
  - Thread management, 9
  - Threads, 9–10
    - compared to processes, 534
    - defining, 530–536
    - managing, 535
    - memory requirements for, 563–569
    - multithreaded applications, 532–533
    - Mutex, 533
    - priorities, 541–553
    - runnable thread:
      - compared to running threads, 537–539
    - thread-safe property, 533
    - viewing, 535
  - Threadtime: The Multithreaded Programming Guide* (Norton/Dipasquale), 533
  - time command, 531
  - Time Of Day (TOD) specification, 1388–1389
  - time.segno.hostname, 375
  - Timeshare priorities, 542–543, 549
  - Timesharing priorities:
    - exception to, 552
    - run queues for, 553
  - timeslice, 540–541
  - Timestamp information, and Complex Profile, 35
  - timex command, 531
  - TLB, 10

**1662** Index

- TOC, 513–518
  - Token Ring, 860, 870, 1113, 1176
  - Tombstone, 505, 509–510, 513
  - top command, 143, 588
  - Top-level domains (TLD), 914
  - Trace mask, 840
  - tracerouter command, 985
  - Traditional mirror, 327
  - Transfer of Control (TOC), 505, 1212
  - transient state, 666
  - Translation Lookaside Buffer (TLB), 7, 450
  - Translative mode, 1129
  - Trigger values, 455–456
  - Trimble Palisade, 978
  - TruCluster, 1174
  - Trunk, 859
  - Trusted Computer System Evaluation Criteria (TCSEC), 1379
  - Trusted Computing Base (TCB), 1380, 1382
    - auditing users/events/system calls, 1391–1399
    - boot authentication, 1399–1402
    - devassign, 1387
    - file format, 1386
    - password policies/aging and password history database, 1387–1389
    - structure of, 1385–1387
    - time- and location-based access controls, 1389–1390
    - ttys, 1386–1387
  - Trusted Gateway Agent, 1496
  - Trusted Gateway Proxy, 1496
  - Trusted intermediary, 1436
  - Trusted Systems, 1087–1088
  - try first pass option, 1051–1052
  - TSIG (Transaction Signatures), 925
    - authentication, 963
    - for zone transfers, 966–968
  - ttisr process, 541
  - tun driver, 798
  - 12-slot PCI cardcage, 17
  - Two-package configuration, Serviceguard extension for SAP, 1361
- U**
- u\_acct\_expire, 1388
  - u\_bootauth capability, 1400
  - u\_genletters, 1387
  - u\_genpwd, 1387
  - u\_maxlen, 1387
  - u\_minchg, 1388
  - u\_nullpw, 1388
  - u\_pickpw, 1387
  - u\_restrict, 1388
  - UAREA, 568
  - uevent1 event, 1395
  - uevent2 event, 1395
  - uevent3 event, 1395
  - UFS (HFS) filesystem, 522
  - uipc driver, 798
  - ulimit built-in command, POSIX shell, 618
  - umask function, 1370
  - umount command, 1045
  - Unbound CPUs, 130–131, 149
  - Unicast addresses, 855
  - Unified Glob of Utilities for Yosemite (UGUY), 29–31
  - Uninitialized data, 568
  - Universally unique identifier (uuid), 375
  - Unreachable route, 897
  - Unspecified Bit Rate (UBR), 1116
  - Untagged VLAN ID, 1153
  - uptime command, 531
  - U.S. National Institute of Standards and Technology, 976
  - U.S. Naval Observatory, 976
  - Usage goal, 632
  - use-on-next-boot flag, 82, 88, 102–105
  - User attributes:
    - allowing read access for proxy user to, 1078
    - restricting write access to, 1075–1076
  - User data, 568
  - User error, 1385
  - user facility, syslogd, 485
  - User Manager for Domains screen, 1048
  - User map, configuring to reference UNIX users to be authenticated by the NTLM servers, 1052
  - User mode, 10
    - processes, 537–539
  - User Network Interface (UNI) cell, 1116
  - User stack, 568
  - User text, 568
  - User timeshare priorities, 543
  - User-level security settings, 1369, 1370–1376
    - review of, 1370–1376
  - /usr/contrib/sendmail, 1004
  - Utility subsystem, 28–30
  - uucp facility, syslogd, 485
- V**
- /var/adm/crash, 172
  - Variable Bit Rate (VBR), 1116
  - Variable length subnet masks, 816
  - Variable Page Sizes, 7–8
  - Variable-length packets, 1112–1113
  - Vector-distance routing protocols, 890, 899
  - Verified design, 1381
  - Verified protection, 1381
  - Verisign, 1436
  - Verisign PKI, 1466
  - Veritas Cluster Services, 1174
  - VERITAS Cluster Volume Manager (CVM), 1184
  - Veritas Volume Manager (VxVM), 309–379, 790
    - compared to LVM, 311
    - deporting/importing of a disk group, 364–366
    - dirty region log (DRL), 313
    - disk group, 311
    - disk media, 311–312
    - Dynamic Multipathing (DMP), 313, 370–373
    - dynamic relayout, 367–369
    - failed disk, recovering, 333–342
    - LVM to VxVM conversion, 369–370
    - plex, 312–314
    - preferred plex read policy, 325
    - private region, 313
    - round robin read policy, 324–325
    - selected plex policy, 325

- spare disks:
  - using, 343–346
- subdisk, 312, 314
- volume, 312
- volume layouts, 312
- VxVM diagnostic commands, 373–375
- VxVM disk:
  - basic layout of, 318
  - nopriv disk, 319
  - simple disk, 319
  - sliced disk, 319
- VxVM mirroring (RAID 1), 323–325
- VxVM RAID 5, 332–333
- VxVM rootability, 350–364
- VxVM snapshots, 346–350
- VxVM Striping and Mirroring (RAID 0/1 and 1/0), 325–330
- VxVM striping (RAID 0), 320–322
- Veritas Volume Manager with Dynamic Multi Pathing, 291
- Very Long Instruction Word (VLIW), 6
- `vfork()` system call, 537
- `vgexport`, 203, 364–366
- `vgextend`, 295
- `vgimport`, 203, 294–295, 297, 364–366
- `vhand`, 7
- `vinstat`, 531
- Virtual Address Space (VAS), 7, 449–450, 456, 567, 569
- Virtual addresses, 7–8, 450
  - translating, 581
- Virtual circuit, 1113
- Virtual Connections, 1116
- Virtual hosts, 1094, 1107
- Virtual interfaces (VIs), 1153
- Virtual LAN (VLAN), 1152–1154
  - default VLAN ID, 1153
  - example implementation, 1154
  - IP subnet-based VLAN, 1153
  - port-based VLAN, 1153
  - protocol-based VLAN, 1153
  - tagged VLANs, 1153
  - Untagged VLAN ID, 1153
  - Virtual LAN (VLAN), 1152–1154
  - VLAN ID, 1152
  - VLAN tag, 1153
  - VLAN trunking, 1153
  - VLAN-aware switches, 1152–1153
- Virtual memory, 7–8, 529
- Virtual memory management, 448–452
- Virtual memory system, 449–452
  - as paging system, 448
  - trigger values, 455–456
  - when to throw pages out, 455–457
- Virtual Page Number (VPN), 450–451
- Virtual Partition Database, 129
- Virtual Partition Monitor, 129, 135, 139–140
  - interfacing with, 163–167
  - rebooting, 161–163
- Virtual Partitions, 13, 121, 127–184
  - changing the boot string for, 170
  - defined, 127, 129
  - hardware details, 134
  - key benefits of, 128–131
  - managing hardware within, 148–161
  - planning, 132–134
  - removing, 172–175
  - resetting, 171–172
  - turning off functionality, 175–179
  - `vpmon`, rebooting, 161–163
- Virtual Partitions product, obtaining, 131
- Virtual PPA (Physical Point Attachment), 1153
- Virtual PPA (Physical Point of Attachment), 1153
- Virtual Private Network (VPN), 1154–1157
- Virtual SCSI Bus (VSB), 204–206
  - address, 203–204, 207
- VirtualVault, 1495–1496
- VLAN ID, 1152
- VLAN tag, 1153
- VLAN trunking, 1153
- VLAN-aware switches, 1152–1153
- VLIW architecture, 10
  - key characteristics of, 6–7
- `vmunix`, 779
- Volume, 312
- Volume groups, exporting/importing, 291–299
- Volume layouts, 312
- Volume management, 529
- Volume/Plex states, 341
- `vPar`, 127
  - booting from an Ignite-UX server, 145–148
  - database, creating, 134–144
  - intended configuration, 133
- `vparboot` command, 147, 168
  - `p vpar0` option, 156
- `vparcreate` command, options, 134–135
- VPARMGR, 134
- `vparmodify` command, 168
- `vparreset` command, 168
- `vPars`, 13
- `vparstatus`, 167
- `vParsWINSTALL` directory, 131
- `vpdb`, 129
- `vpmon`, 129, 135, 161–163
  - `a` option, 140
- VPN (Virtual Private Network), 1495
- `vps_ceiling`, 582
- `vps_pagesize`, 582
- `vxassist` command, 316, 323
  - `addlog` option, 350
  - `o` option, 324
  - `resyncfromreplica` option, 349
  - `snapshot` option, 346–350
  - `snapwait` option, 346
- `vxbootsetup` command, 361–362
- `vxclustd`, 1184
- `vxconfigd`, 319
- `vxcp_lvmroot` command, 351–354, 370
- `vxdc0` command, 350
- `vxddladm` command, 370
- `vxdg` command, 318
- `vxdisk list` command, 374
- `vxdiskconfig` command, 370
- `vxdumpadm` command, 372–373
- VXFS Access Control Lists, 1371–1375

## 1664 Index

- VxFS filesystem:
    - tuning, 421–428
  - VxFS Snapshots, 431–434
  - vxinstall command, 315, 319
  - vxmend fix CLEAN command, 342
  - vxprint command, 324, 328, 340, 345
  - vxprivutil command, 374
  - vxrelocd command, 343–345
  - VxVM, 9
  - VxVM Device Discovery Layer (DDL), 370
  - VxVM disk:
    - basic layout of, 318
    - nopriv disk, 319
    - simple disk, 319
    - sliced disk, 319
  - VxVM Disk Discovery Layer, 366
  - VxVM Dynamic Multi-Pathing, 8
  - VxVM mirroring (RAID 1), 323–325
  - VxVM RAID 5, 332–333
  - VxVM rootability, 350–364
  - VxVM snapshots, 346–350
    - defined, 346
    - snapstart command, 346–347
  - VxVM Striping and Mirroring (RAID 0/1 and 1/0), 325–330
  - VxVM striping (RAID 0), 320–322
  - vxvmbot command, 357, 362–363
    - v option, 363
  - vxvmconvert, 369
  - vxvol init zero <volume> command, 323
- W**
- warning facility, syslogd, 485
  - wdb tool, 535
  - Web QoS, 1496
  - Web Server Cluster, 1173
  - Webmin, 1103, 1106
    - main screen, 1106
  - when column, 984
  - WHO command, 55
  - Wide Area Network (WAN) protocols, 1112
  - Williamson, Malcolm, 1439
  - Windows 2000, Active Directory Service (ADS), 1087
  - Windows NT LanManager (NTLM) authentication, *See* NT LanManager authentication (NTLM)
  - Windows server, using to perform authentication and PAM, 1047–1052
  - Windows zone, 1140
  - WINSTALL file, Ignite-UX, 131
  - Work Load Manager (WLM), 1177
  - WorkLoad Manager (WLM), 530, 623–634
    - configuration file, 623–630
    - defined, 623
    - prioritizing workloads with, 601–622
    - specifying a goal, 630–633
    - toolkits, 634
    - WLM rendezvous point, 631
  - Workstation, 5
  - World Wide Names (WWNs), 1124–1126
  - Worldwide timekeepers table, 976
  - WU-FTPD 2.6.1, 853
  - WU-FTPD daemon, 1492
  - WWNs, 1124–1126
- X**
- X.25, 1113
  - X.500, 1067
  - X.509 v3 certificates, 1496–1497
  - XBC interface, 21–22
  - xd command, 788
  - XML, 1107
  - xntpd command, 980, 982, 992
  - xntpgc command, 986
  - XP (eXtended Platform) disk array, 1149
- Y**
- y option, parcreate command, 88, 94
  - Yellow Pages, 1065, 1067
  - Yeong, W., 1067
  - YPLDAP protocol gateway, 1068
- Z**
- Zimmerman, Phil, 1495
  - Zombies, 537–539
  - Zone, 912–913
  - Zoning, 1139–1141